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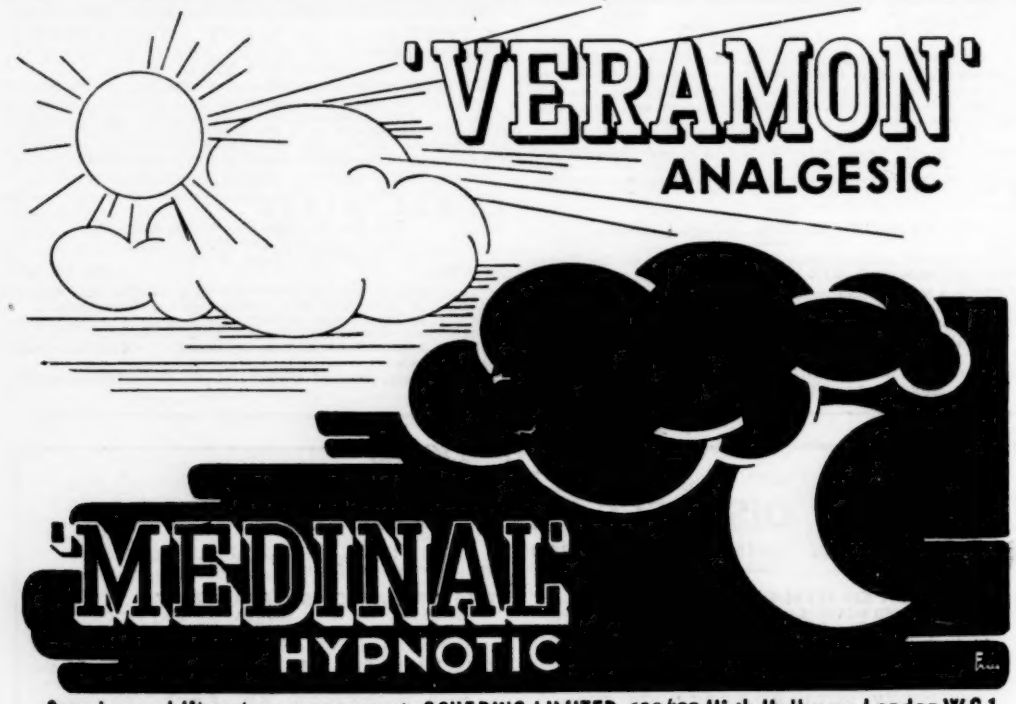

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ADDRESSES AND ORIGINAL ARTICLES

THE PREVENTION OF CANCER [1]

By W. Sampson Handley, M.S. Lond., F.R.C.S. Eng.
SENIOR SURGEON TO THE MIDDLESEX HOSPITAL

It is quite possible that a medical or systemic cure of cancer will be discovered before the nature of the neoplastic process is fully understood, for the use of quinine and mercury, in malaria and syphilis respectively, preceded the discovery of the organisms of these diseases. On the other hand the technique of prevention of a disease would appear more closely dependent upon knowledge of its causation. The prevention of malaria waited upon that knowledge of the life-history of the malaria parasite which Laveran, Manson, and Ross supplied. I believe that a general conception of the origin of the cancer process, founded upon observed facts, can now be arrived at, however obscure the intimate nature of the process may remain. If so, the prevention of the disease can be approached in a more hopeful spirit, and my choice of subject may be justified.

Theories of the Causation of Cancer

Any theory of the causation of cancer must cover and unify an extraordinary and miscellaneous range of observed facts. The late Prof. Archibald Leitch in 1927 collected these facts together without deducing from them any theory. He pointed to Pott's observation that chimney-sweeps were especially liable to cancer of the scrotum as the first gleam of light on the origin of cancer—showing it to be a disease of local and not of constitutional origin. Pott noted that the disease slowly and imperceptibly evolved from a simple wart resulting from prolonged contact of soot with the skin. It was Leitch himself who showed that the soot did not act mechanically, and that its admixture with the sebaceous secretion of the scrotum was necessary to activate it. The fatty secretion dissolved out of the soot some active cancerogenic agent in minute quantity.

In 1771 Volkmann described cancer of the anus and scrotum in workmen employed in lignite distillation plants and due to the crude distillates of tar or paraffin. Some years ago Alexander Scott described the cancers occurring in Scotland in workmen exposed to shale-distillation products. Crude petroleum and some refined oils also have been found to cause cancer. A. H. Southam and S. R. Wilson found that cotton spinners, exposed to a spray of mineral oil from the spindles, suffer from cancer of the scrotum. Workers in hot tar are liable to cancer on the exposed forearms and also on the scrotum. The chewing of betel-nut mixed with lime often produces cancer inside the cheek and upon the gums.

Reviewing such facts as these there is little cause for surprise if the inference was drawn that cancer is due to direct local chemical irritation of the epithelium. Soon however it appeared that physical irritants might be substituted for chemical irritants without any alteration in the final result. Theodore Maxwell in Kashmir noted that repeated burns of the skin, resulting from the wearing under the robes of the kangri basket containing hot charcoal, might eventually lead to cancer. Twelve years after the discovery of X rays the first X ray cancer was evolved. Prolonged exposure to radium produced the same result. G. M. Findlay has produced papilloma and carcinoma in white rats by exposing the ear to ultra-violet light. Rodent ulcer and epithelioma of the skin are especially frequent in Queensland where a white race unprotected by pigment is exposed to a tropical sun.

The radiation cancers were brought under the fold of the irritation theory of cancer by a simple expedient. It was admitted that the irritation might be chemical or physical.

ARSENIC AND ANILINE CANCER

About 1887 Jonathan Hutchinson drew attention to a form of cancer arising in patches of psoriasis in patients who had taken arsenic therapeutically for long periods. The same thing occurs in arsenic workers in Styria, and Leitch observed cases in men engaged in the manufacture of sheep-dip and weed killer. In arsenic cancers the metal inhaled or swallowed is excreted by the skin, and the growths may be widespread and multiple. Workers in aniline dyes are subject to cancer of the bladder, probably owing to the excretion of ingested dye-products in the urine.

There was no difficulty in applying the irritation theory to cases where the irritant acted during its excretion upon the excretory organs. Certain difficulties however showed themselves, particularly the fact that the cancer might show itself many years after the patient's last contact with the irritant, and that some violent irritants such as mustard oil have no cancer-producing power. It became necessary to define an irritant as any substance or agent which can induce cancer. It thus became clearer than ever that cancer is due to chronic irritation.

LUPUS AND SYPHILIS CANCER

Many years after an area of lupus has completely healed, and apart from any therapeutic treatment, it may become the seat of squamous-celled carcinoma. A tongue which has suffered from mucous tubercles and syphilitic glossitis in the secondary stage of syphilis is likely in later life to be affected by chronic glossitis and epithelioma. The irritation theory was accordingly modified by including certain bacteria in the list of cancer-producing irritants, and later certain parasitic worms were added to it, following Fibiger's discovery that cancer could be produced in underfed rats by feeding them with cockroaches infected with gongylonema, a minute parasitic worm. The ova of ankylostoma duodenale invading the mucosa of the bladder were found to cause cancer of that organ. Peyton Rous and W. E. Gye found that a filter-passing virus was the cause of sarcoma in fowls. J. B. Murphy, of the Rockefeller Institute, maintained that the supposed virus was of the nature of a ferment. Recently a virus has been incriminated by R. E. Shope as the cause of an infective papilloma in rabbits which may become malignant, but this is the only instance in mammals where substantial evidence for a virus as a possible cancer agent has been produced.

LYMPH STASIS AND CANCER

In such a tangle of miscelianeous causes it is fair to assume that links in the chain of causation are missing, and that as the final result—cancer, is approached unity of causation might be detected. I believe that in lymph stasis and its physiological

[1] Being the seventeenth Mitchell Banks Memorial Lecture delivered at the University of Liverpool on Nov. 21st, 1935.

consequences I have found the single immediate cause of cancer. All the various cancerogenic agents have I believe this quality in common that they can produce lymphangitis and consequent lymphatic obstruction. I have been able to demonstrate the presence of lymphatic obliteration and consequent lymph stasis in precancerous areas due to the ravages of syphilis, tubercle, X rays, or radium, or resulting from the chronic lymph stasis of chronic mastitis. No single organism or virus is specifically and exclusively associated with the production of cancer. Any physical or chemical agent, any organism or mixture of organisms, able to cause lymphangitis, may set going a process which in ten, twenty, or forty years may eventuate in malignancy.

The Pathology of Lupus Cancer

For the sake of brevity I desire to concentrate attention upon one particular form of cancer, lupus cancer, in which the stages of the process which leads to cancer are easily demonstrable. I would first insist that tubercle bacilli may have disappeared for many years from the original area of lupus before cancer appears in it. A sound scar with a few papillomata upon it may be the only residue of the original disease. The epithelium appears healthy and there is nothing to indicate that the tuberculous poison has produced any change in it. In the early stage of lupus, the stage of active extension and ulceration, before repair has begun, the epithelium seems entirely passive. It quietly disappears as the lupus nodules undermine it. When repair begins the epithelium spreads over the new granulation tissue in a normal way. Sometimes the lupus process is not intense enough to cause ulceration. It then gives rise to papillomatous elevations of the skin. A section through the growing edge of such an area of papillary lupus—a section taken outside its visible margin—shows with crystal clearness not only the nature of the lupoid process, but also the nature and mode of origin of papilloma. Just as a lacteal is the central structure of an intestinal villus, a capillary lymphatic end-sac is the central structure of a villus of the skin. It can be seen that over a zone about ½ inch wide outside the apparent edge of the lupus area the papillary lymphatics are blocked by proliferation of their endothelium.

Evidently lupus is essentially a tuberculous lymphangitis of the skin lymphatics. Furthermore it can be seen that the blocking of the central lymphatic has upset the hydrostatic arrangements of the papilla. The tissue fluid can no longer flow freely out of it and the papilla begins to swell and to elongate. From the edge of the specimen back towards the centre of the lupus area a gradual elongation of the skin papillæ up to ten times their normal length can be traced. Their connective tissue receives from this lymph congestion a powerful stimulus to proliferation in which at a later date the epithelium shares. How powerful is the nutritive stimulus of lymphatic obstruction upon the tissues subjected to it is well seen on a large scale in the huge legs of elephantiasis. Wherever a papilloma is found it may be presumed, and it can frequently be demonstrated, that this process of obliterative lymphangitis has previously affected the lymphatics of the papilla. It is a fact of the highest significance that nearly every form of cancer affecting squamous celled, transitional or columnar-celled surfaces is preceded by papilloma. In the case of glandular mucous membranes such as that of the stomach, cancer is preceded by adenoma, which is also a manifestation of lymphatic obstruction. The close and almost universal association of papilloma and adenoma with cancer shows in my opinion that lymphatic obstruction is a precursor of cancer which may fairly be described as its cause.

It is easy to understand how the physical stimuli which cause cancer are able to cause lymphangitis and lymphatic obstruction. In X ray dermatitis the obliteration of some lymphatics and the dilatation of others are easy to demonstrate. But at first sight tar-cancer seems to be a difficulty. Here the tar is applied directly to the epithelium which subsequently becomes cancerous and direct irritation seems proved. But Ludwig Kreyberg has studied the changes in the mouse, produced by tar-painting, and has shown that the initial change is an infiltration of the subepithelial tissues by polymorphic leucocytes. The primary response to tar-painting occurs in the connective tissue and its appearances are those of an acute lymphangitis.

CHRONIC MASTITIS

A study of the physiology of the breast shows that nature's method of inducing proliferation is to pour out an excess of lymph into the tissue interspaces, and provides further evidence of the important part played by lymph stasis in physiology and in the genesis of cancer. The recurrent monthly physiological lymph stasis which occurs in the breast temporarily stimulates the proliferation of all its tissues. If lymphatic return from the breast is hindered by local areas of lymph obstruction, probably due in most cases to casual and unnoticed infections of one or more breast-ducts where they open upon the nipple, the stimulus of lymph congestion instead of being periodic becomes permanent. The lobe whose duct has thus been infected is unable to empty itself of lymph, and receives a permanent stimulus to proliferation. The lymphatics are blocked by proliferation of their own endothelium. The ducts are surrounded by a sheath of adventitious fibrous tissue due to proliferation and blocking of the periductal lymphatics. Papillomata appear within them as the nutritional stimulus begins to affect the epithelium, and finally carcinoma may supervene.

It is the fashion to ascribe the various diseases which affect the breast to endocrine disorders, and there is of course no doubt that the breast is under endocrine government. But morbid conditions such as chronic mastitis affecting single and separate lobes of the breast, and sparing other lobes of the same breast, cannot be accounted for by general endocrine influence. A local factor must be present, and that local factor is permanent lymph stasis. The various steps which lead from lymph stasis through chronic mastitis to cancer may be easily demonstrated histologically. Space forbids me to discuss other forms of carcinoma or to discuss congenital moles in which developmental defects of the lymphatic system lead to local areas of lymphatic obstruction and papillomatous hypertrophy, and sometimes to carcinoma or sarcoma.

Prevention in the Light of Ætiology

If the lymph-stasis theory of cancer is valid the simple recipe for the prevention of cancer is to maintain the lymphatic circulation throughout the body in a state of high activity. If, as is often stated, though without conclusive evidence, cancer is relatively infrequent in wild animals, this may well be due to the superior vigour of their lymphatic circulation, the result of an active life. Even in local areas of lymph stasis a sufficient minimum

flow may thus be secured to avert a threatened carcinoma. Civilised man may well take the hint, remembering that as E. H. Starling showed a resting limb produces hardly any lymph. Civilised man is apt to overstrain his glandular mechanisms, especially those of digestion, while at the same time he allows his muscles to fall into disuse. Glandular secretion increases the production of lymph without doing anything to promote the lymphatic circulation. Muscular exercise on the contrary brings into play all the forces which maintain the lymphatic circulation—the pulsation of adjoining arteries, the massage action of muscular contraction and of bodily movements, and the aspiration effects of deep respiration. Thus regular exercise and moderation in eating are likely to stave off cancer, but a heavier stress must be laid on the avoidance of infections and their prompt treatment, for the small local areas of lymph block in which cancer arises are most often due to bacterial infections, severe or slight. In this connexion dental infection requires special stress, for as F. St. J. Steadman [2] showed, cancer of a dentally clean mouth is a rarity.

PREVENTION OF CANCER IN PRECANCEROUS AREAS

Sometimes the best method of dealing with precancerous areas is to excise them. The enlarging mole, or the papillomatous area in chronic glossitis, may thus be dealt with. But the method is sometimes impossible and never popular.

Irradiation of Precancerous Areas.—It would appear quite feasible to administer to precancerous areas a sufficient dose of radiation to depress the activity of the potentially cancerous epithelium. In this connexion I will only refer to one variety of cancer, and give prima facie evidence that a short course of deep X rays will avert cancer in precancerous breasts.

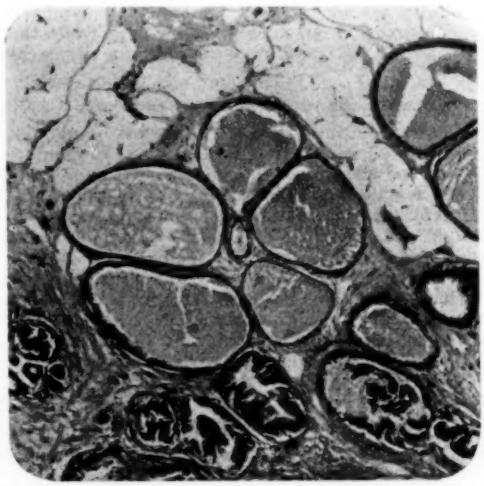
I may remind you that in the year 1900 at the Pathological Society of London the late F. T. Paul [3] of this city first drew attention to the association between chronic mastitis and tumour formation. Though the question continues to arouse controversy there is in my mind no doubt of the intimate connexion between chronic mastitis and subsequent cancer.

In 1910 I advocated [4] the X ray treatment of chronic mastitis, which has since been widely adopted. The sector-shaped indurations of chronic mastitis frequently soften or disappear after three half-pastel doses of X rays. At that early period the modern hard X ray was unknown, and among several hundred cases of chronic mastitis treated in this way several developed cancer. Of late years I have continued to use the method, but have advised the high potential short wave X ray of 180,000 volts. Several hundred cases have been treated for me in this way by Dr. Russell Reynolds, Dr. Douglas Webster, and other radiologists, and in no single case has cancer supervened in the breast treated. When a breast has suffered from chronic mastitis and cancer, the other breast is likely in the course of years to follow the same course. I will give an instance.

Five years ago I operated upon a nurse with cancer of the right breast. Three years ago I found a mastitic thickening in the other breast and urged either mastectomy or X ray treatment for this breast. The patient rejected my advice, and was only seen again recently, when she had a hopeless carcinoma originating in the mastitic area of the remaining breast—not a recurrence but a second primary growth.

[2] British Dental Journal, 1923, xliv., 1325.
[3] Trans. Path. Soc., London, 1900, lii., 30.
[4] Practitioner, 1910, ixxxiv., 463.

In another case I tapped a cyst in the left breast three years ago. Three doses of deep X rays were applied to the breast. The patient was seen again recently. The left breast was normal, but the right breast to which no X rays had been applied had to be removed for a suspicious induration which showed cystic changes and areas of papillomatous proliferation, undoubtedly precancerous, in the ducts (see Figure). In this case X rays appear to have arrested the morbid evolution in the breast which was primarily affected. The second or control breast, at first the healthier breast, continued to evolve towards carcinoma.



Precancerous changes in the untreated breast. The other breast, which had given earlier evidence of similar tendencies, remained normal three years after X ray treatment.

I could adduce other cases tending to show the preventive action of X rays upon precancerous breasts. The problem is one of great importance, and could be definitely settled if 1000 women would permit one breast to be irradiated at the age of forty, the other breast remaining untreated as a control. A complete follow-up in each case would of course be necessary. A preventive course of X rays to both breasts is at any rate harmless, and should certainly be given when the breast has done its work to all women with a strong family history of cancer, or suffering from chronic mastitis.

PENILE CANCER: PREPUTIOTOMY

Carcinoma of the penis is not a common, but not a very rare form of the disease. At the Mayo Clinic 195 cases were seen from 1907 to 1932; about one case in every 300 of male cancer. The institution of circumcision has provided for the Jews complete protection against penile carcinoma. The origin of the operation is lost in the mists of antiquity but it was practised by the Egyptians of the predynastic era, and the oldest known mummy, that of Ra-Nefer in the R.C.S. Museum, presents evidence of circumcision. A simpler operation would produce the same protective result. If the dorsum of the prepuce is slit up as far as the glans, and a stitch if necessary inserted at the upper end of the incision, within a few years time, owing to the gradual retraction of the lateral flaps of the prepuce, the result will be indistinguishable from that of circumcision. If performed just after birth the little operation can be done without an anæsthetic.

In phimosis a delicate mucous membrane is exposed for life to the attack of a mixed bacterial flora living under complete shelter, and also to the chemical action of decomposing secretions. Recurrent attacks of lymphangitis of the glans, and the resulting lymphatic stasis, provide the basis for papilloma and cancer. S. K. Ngai, in reporting on 107 cases of carcinoma of the penis in China,[5] found that of 88 patients who made a positive statement on the matter 87 had had phimosis. Carcinoma of the penis is frequent among Chinese farmers and coolies, rare in the educated classes. That the Jewish immunity is not racial is indicated by Wolbarst's case occurring in an uncircumcised Jew, while there is no case in the literature occurring in a circumcised Jew.

PHIMOSIS AND UTERINE CARCINOMA

There is evidence that the existence of phimosis, or in its absence carelessness as to subpreputial hygiene and cleanliness, is a menace even more serious to the female sex than to the sex in which they originate. Briefly stated the evidence is this, that though certain forms of cancer—of the liver, the breast, and the rectum for instance—affect Jews more frequently than non-Jews, Jewish women show a much smaller liability to carcinoma of the cervix. In Amsterdam the non-Jewish inhabitants were found by Hoffman to show an incidence to cervix cancer of ten per 100,000, while the corresponding figure for Jewish women was less than four.

Cancer in Amsterdam 1919–29 (Hoffman)

	Catholics.	Jews.
	(per 100,000)	
Stomach	47·9	32·9
Liver and gall-bladder	13·21	17·16
Intestines	12·66	9·49
Uterus	10·19	3·6
Breast	9·32	11·3
Œsophagus	9·51	3·63
Rectum	6·48	8·37
Lung	2·66	3·39

Maurice Sorsby comments [6] on the relative freedom of Jewish women from cancer of the uterus. Vineberg, in the out-patient department of the Mount Sinai Hospital of New York, observed among 19,000 patients, of whom 95 per cent. were Jewish, only 18 cases of uterine cancer and nine of these were in non-Jewish women. Thus the incidence among the Jewish women was only one-eighteenth of that among non-Jewish. Two other investigations by Rubin at the same hospital for other years gave incidence ratios of 1 to 7½ and 1 to 15 for Jews and non-Jews. Similar evidence is quoted by Sorsby from the Mayo Clinic. In every thousand non-Jewish patients seen at the Mayo Clinic six have carcinoma of the cervix; in every thousand Jewish patients only one has carcinoma of the cervix. Similar evidence is quoted by Sorsby from Paris, Budapest, Munich, Amsterdam, and Montreal. He concludes: "All the available evidence is therefore unanimous in pointing to a definitely lower incidence of uterine cancer among Jewish women." He believes that the hygienic ritual imposed on women by the Mosaic law accounts for their immunity, but the explanation seems unconvincing. The cervix exists normally under the same optimal conditions for bacterial life which are found under the phimotic prepuce. It is not surprising if marital infection with the subpreputial flora may lead to cervical cancer in the course of twenty or thirty years, just as in the male it leads to penile cancer. Immunity to penile carcinoma and partial immunity to cervix cancer are not constitutional peculiarities of the Jewish race. There is another race which enjoys the same privileges, and that race also practises circumcision.

During a brief visit to Fiji in 1927, my attention was drawn to the occurrence of penile cancer in the Indian inhabitants originally imported from India, and to its absence among the aboriginal Fijians. The two races live side by side without mixing and the islands contain about 90,000 Fijians and 70,000 Indians. The Fijians, but not the Indians, practise circumcision at puberty. I endeavoured to find out the relative liability of the women of the two races to cervix cancer.

A search through the careful reports of the Colonial War Memorial Hospital at Suva, Fiji, shows that during the eight years, 1925–32 inclusive, three cases of cervical carcinoma in Fijians were admitted, and 26 cases in Indian women. Thus the smaller of the two population groups, the one not practising circumcision, shows an incidence of cervix cancer upon its women more than eight times greater than the incidence of the disease upon women of the other or circumcised nation. The total number of hospital cases of malignant disease of all kinds in Indians was 97 as compared with 61 in Fijians.

The freedom of the Fijian race from cervix cancer is therefore not due to any racial immunity to cancer, nor can it be explained as illusory and due to reluctance to seek hospital treatment. It must be attributed to the protection which the hygienic operation of circumcision affords against mixed bacterial infections of the cervix during coition. It is customary to ascribe cervix cancer to trauma of the cervix during parturition, but if this were the case both races should be affected equally.

PUERPERAL SEPSIS AND THE MALE

If chronic mixed infections are mainly responsible for cervical carcinoma, it is pertinent to inquire whether the obstinate persistence of high puerperal mortality, in spite of the vigorous campaign directed against it by our health authorities, may have a similar origin. The maternal death-rate per 1000 live and stillbirths, which in 1928 was 1·72, actually rose in 1933 to 1·75. The rise, otherwise difficult to explain in this aseptic era, is intelligible if, as I suggest, an important ætiological factor has been ignored. Educational insistence on strict personal hygiene for the man would be slow and uncertain in its action. Insistence on universal preputiotomy might very well prove to be a controlling factor for this particularly cruel and obstinate scourge of our national life.

In a discussion on Puerperal Blood Infections at the Fifth British Congress of Obstetrics and Gynæcology, held in London in 1925, the late Prof. W. Blair-Bell [7] expressed the view that coitus shortly before parturition might be an important factor in puerperal sepsis. In 20 per cent. of lying-in patients who gave a history of recent coitus, hæmolytic streptococci were found in the vagina.

I have endeavoured to obtain evidence of the relative incidence of puerperal pyrexia in Jewish and non-Jewish women. The Ministry of Health were unable to find for me any study of the subject. It urgently needs investigation. The relations of phimosis to puerperal sepsis should also be studied.

The subject has reached a stage when authoritative advice upon it should be given by the Ministry of Health, or by such a responsible body as the British Empire Cancer Campaign. The question which King Edward VII. asked about tubercle, "If preventable

[5] Amer. Jour. of Cancer, 1933, xix., 259.
[6] Cancer and Race, London, 1931.
[7] Jour. Obst. and Gyn., 1925, xxxii., 243.

why not prevented?" is equally pertinent to the forms of carcinoma we have just considered.

DENTAL HYGIENE

The British Dental Association urges that dental benefit should be made a covenanted benefit under the National Health Insurance Act. The governing body of the British Medical Association resolved in 1928 that "the establishment of periodical medical and dental examinations of all persons insured under the National Health Insurance Acts is urgently called for as an economic proposition, having regard to the return so to be obtained in health and productive efficiency." But examination without treatment is not enough. The task that must be imposed on the dental profession is to maintain the oral hygiene of eighteen million insured workers and their dependants, a total of about forty million persons, most of whom at present receive no attention beyond occasional dental extraction. At a reasonable estimate this means forty million hours' work a year, or eight hours additional work each week-day throughout the year for every person on the Dental Register. The financial aspects of the question are no less alarming, for even at a capitation fee of 12*s.* 6*d.* per annum, the lower of two figures suggested by the British Dental Association, the cost would be twenty-five million pounds a year.

It is clear that the scheme can only be introduced by degrees, and that it must be accompanied by a large increase in the numbers of the dental profession, unless some of the work is delegated under supervision to partially trained persons, a plan which has been successfully adopted in New Zealand with the approval of the local dental profession. It is equally clear that self-help must be invoked. A weekly voluntary contribution of twopence from each beneficiary, to which Parliament or the approved society might be asked to add another penny, would launch the scheme, and it would gradually grow as the people came to realise its advantages.

Until dental hygiene is secured there is little hope for any further diminution in cancer of the mouth, tongue, pharynx, œsophagus, and stomach, and gastric and duodenal ulcers will continue to wreck many lives.

A Practical Programme

Let me now sum up my simple practical programme for the prevention of cancer: Preputiotomy on all male infants at birth for the abolition of penile cancer, the diminution of cancer of the cervix in women to one-sixth of its present incidence, and a probable incidental lowering of puerperal mortality. Instruction of men in the importance of personal hygiene. A short prophylactic course of deep X rays to the breasts in all cases of chronic mastitis, especially if cystic, for the prevention of breast cancer. Dental treatment of the people on a national basis for the prevention of cancer of the mouth and alimentary canal.

CHESTER ROYAL INFIRMARY.—It was stated at the annual meeting of this hospital that it treated one person out of six of the local population during the last year. Ordinary income almost equals ordinary expenditure, but more income will be needed, since the full cost of the additional nurses engaged on completion of the nurses' home extensions has not yet been felt. The extension of the out-patient department is becoming urgent. The establishment of a preliminary training school has been approved and probationers will be admitted for courses of six weeks.

ON THE POSSIBLE RÔLE OF THE ANTERIOR PITUITARY IN HUMAN DIABETES

BY O. L. V. DE WESSELOW, D.M. Oxon., F.R.C.P. Lond.

PROFESSOR OF MEDICINE, UNIVERSITY OF LONDON; DIRECTOR OF THE MEDICAL UNIT, ST. THOMAS'S HOSPITAL; AND

WILLIAM J. GRIFFITHS, Ph.D. Lond., A.I.C.

HENRY GEORGE PLIMMER FELLOW IN PATHOLOGY, DEPARTMENT OF CHEMICAL PATHOLOGY, ST. THOMAS'S HOSPITAL

AN increasing appreciation of the factors involved in the control of the blood-sugar has again opened up the whole question of the ætiology of "diabetes." We may, perhaps, formulate the orthodox position somewhat as follows. After exclusion of certain well-recognised types of glycosuria, such as those associated with thyrotoxicosis, hyperadrenalæmia, and some pituitary lesions, the remainder of our patients who exhibit hyperglycæmia and glycosuria are assumed to form a more or less homogeneous group, and to be suffering from varying degrees of insulin deficiency. Inability to store and utilise carbohydrate is to be ascribed to this lack of insulin, with resulting hyperglycæmia, glycosuria, and ketonuria; their low respiratory quotient (R.Q.), both fasting and after ingestion of carbohydrate, appears to afford contributory evidence of a lack of carbohydrate oxidation. This conception of insulin inadequacy has been enormously strengthened by the success of insulin therapy.

Although insulin has made it possible to restore the diabetic to a normal state of carbohydrate metabolism the mode of action of this hormone has for long remained obscure despite the most searching inquiries. During the last few years, however, the importance of so-called diabetogenic factors of pituitary origin, resulting in a disturbance of the normal regulation of carbohydrate metabolism, has been established, mainly by the work of Houssay and his colleagues.[1] For details of this work the reader is referred to the recent publications of Collip.[2] Houssay was able to show, first in the toad and subsequently in the dog, that removal of the anterior lobe of the pituitary gland in the depancreatised animal is followed by amelioration of the diabetic symptoms: hyperglycæmia, glycosuria, and ketonuria are diminished, and there is a gradual rise in the R.Q. and a fall in the urinary D : N ratio (Soskin[3]). By injection of pituitary substance into these depancreatised-hypophysectomised animals the improvement in the diabetic condition was abolished. It appeared, therefore, that the symptoms arising from pancreatectomy are to some extent of pituitary origin. In further confirmation of this diabetogenic action of the pituitary, Houssay and his co-workers[4] showed that injections of anterior pituitary extracts into the normal toad, dog, and other animals lead to hyperglycæmia, glycosuria, and ketonuria. This work is of especial interest in view of the association of acromegaly and glycosuria and, indeed, it had been shown by Borchardt,[5] as early as 1908, that injections of extracts of bovine pituitary glands into rabbits result in hyperglycæmia and glycosuria.

In view of these striking experimental results in animals it is natural that the question of the significance of the pituitary in relation to human diabetes should arise: do any of the metabolic disturbances which we have hitherto regarded as due to insulin

deficiency in fact arise from a disturbance of the function of the anterior pituitary? The glycosuria which is so frequent in acromegaly lends support to the view that glycosuria in man may result from pituitary dysfunction; glycosuria is also a feature of the Cushing syndrome. There is, moreover, another group of cases showing disordered carbohydrate metabolism in which the possible rôle of the pituitary cannot be ignored; we refer to those patients, usually past middle age and obese, in whom glycosuria and hyperglycæmia, but little ketonuria, are present, and in whom the subjective symptoms are relatively mild and the course of the disease protracted. In such patients the glycosuria is not infrequently discovered accidentally, attention being first drawn to its presence in the female by the appearance of vulvitis; apart from this the often gross glycosuria does not appear to affect the patient's well-being. This class of patient differs materially from the typical young diabetic, in whom the disease is accompanied by marked ketosis, wasting, and if untreated a rapid progress to coma and death.

In the present unsatisfactory state of our knowledge these two classes of patients, in whom the course and prognosis of the condition are so widely different, are perforce included in a single group under the head of "diabetes." It is at least possible that the hyperglycæmia and glycosuria characteristic of both groups constitute a purely superficial resemblance and that the underlying causes of the condition are as different as those in the depancreatised animal and in the animal receiving anterior pituitary substance by injection.

EXPERIMENTAL

With the object of obtaining some insight into this problem we have studied the effect of a preceding injection of "diabetic" blood as compared with "normal" blood on the response of the rabbit to insulin.

We have used immature male rabbits of about 1 kg. body-weight, maintained on a diet of cabbage, oats, and bran. The animals were starved for 18 hours before the experiment. Three hours before the response to insulin was determined, 10 c.cm. of the plasma to be examined was injected subcutaneously into the animal. The plasma was obtained from heparinised blood, spun out immediately after withdrawal and preserved in a refrigerator, in most cases over-night; in a few instances the plasma was injected within one hour of bleeding the patient. Three hours after injection of the plasma the animal received 0·2 unit of commercial insulin (Boots) into the marginal vein of the ear. The blood-sugar was estimated by MacLean's method on 0·1 c.cm. of blood withdrawn from an ear vein before and at quarter-hour intervals, for one hour after injection of the insulin. Two or three days before testing the effect of plasma, an insulin curve was obtained on every animal without preliminary injection of plasma. Young animals were employed with a view to obtaining a larger dose of plasma per unit of body-weight, and in the hope that they would prove more sensitive as test-objects. With very few exceptions a fresh animal was employed for each plasma tested.

The patients whom we have studied may be divided into four groups and the blood-sugar curves obtained in each group, together with the corresponding control curves, are averaged and are shown in Figs. 1–4. These groups were as follows:—

(I.).—Controls. 9 middle-aged subjects; 4 males and 5 females, suffering from various chronic diseases but with no disturbance of carbohydrate metabolism and on an ordinary mixed diet.

(II.).—7 young diabetic patients; 3 males and 4 females, of whom 6 were under thirty, while in the remaining case the disease had appeared at the age of thirty-six. All but 2 of these had been receiving insulin for some time.

(III.).—16 elderly diabetic patients; 1 male and 15 females, all but 2 of whom were between the ages of fifty and seventy-five. With the exception of 1 female, the blood pressures of these subjects were abnormally high and the great majority were overweight. 3 only were receiving insulin, the remainder being dietetically treated.

(IV.).—6 subjects from Group III. whose plasma appeared definitely to affect the blood-sugar response to insulin; the average of ten curves obtained from these individuals is given.

RESULTS

Inspection of the curves shows that after injection of plasma obtained from the subjects of Groups I. and II. (i.e., the controls and young diabetic patients) there was no appreciable alteration in the form of the blood-sugar curve during the period following injection of insulin (Figs. 1 and 2). In the case of the elderly diabetic subjects of Group III., however, it would appear that a preliminary injection of the plasma into the animals resulted in an early arrest of the fall in blood-sugar after insulin; associated with this premature arrest there was a very definite tendency for the blood-sugar to be higher than the control values during the remainder of the experiment (Fig. 3). This effect of a diminished fall and a more rapid restoration of the blood-sugar after injection of the plasma of these patients is particularly evident in Group IV. (Fig. 4), in which the curves of those members of Group III. who seemed to us to give a positive response have been separated from those in whom the response was negative. We wish particularly to call attention to the following points: (1) that during the second 30-minute period following injection of insulin the blood-sugar had already begun to rise; and (2) that after 60 minutes the average blood-sugar exceeds the initial value; in these respects the curves obtained after injection of plasma are in sharp contrast with those of Figs. 1 and 2.

DISCUSSION

Our findings suggest that, whereas the plasma of normal and young diabetic subjects produces no alteration in the blood-sugar response of the rabbit to insulin, the plasma of some elderly diabetics, of the type which we have defined, injected under similar conditions profoundly modifies the action of insulin.

During the period of our experiments, and with the dosage of insulin used, the average blood-sugar of untreated rabbits shows a progressive fall, with some slight tendency to rise during the final period. In comparison it will be seen that the alteration in the average blood-sugar curve following injection of a plasma with which a positive result was obtained is confined to the end of the curve (Fig. 4); the curves of the injected animals and controls fall together during the first 15 minutes, and then diverge, the blood-sugar of the injected animals rising rapidly above that of the controls. Because the initial rate of fall of the blood-sugar is the same in both treated and untreated animals, it would seem that there is no question of any directly acting anti-insular substance in the plasma; in other words, there is nothing in the positive plasma capable of affecting the rapidity of the initial response of the animal to insulin.

In the normal animal a compensatory mechanism becomes effective when the blood-sugar falls to a level determined by the amount of insulin injected and the blood-sugar begins to return to its original level. The period of our experiments being relatively short, in our control animals this mechanism has not had time to produce an appreciable rise in blood-

sugar, but the injected animals giving a positive result appear to be sensitised to its action and in consequence their blood-sugar rapidly regains its initial value.

Observations on the action of anterior pituitary extracts on the blood-sugar response of animals to insulin which bear a close resemblance to our findings have already been recorded. Cope and Marks [6] have studied the effect of hypophysectomy on the response of the rabbit to insulin. These workers found that although hypophysectomy did not alter the rate of fall of the blood-sugar after insulin, the recovery phase was practically absent, so that the blood-sugar continued to fall during the late stages of the curve. Rupp [7] and Houssay [8] have shown that secretion of adrenaline by the adrenal glands is an important factor in the restoration of the blood-sugar in hypoglycæmia, and Cope and Marks [6] were able to demonstrate that adrenaline appeared in the blood of their hypophysectomised animals although no rise in blood-sugar occurred, and attributed this failure of the normal compensatory action of adrenaline to the absence of an anterior pituitary factor necessary for the discharge of glycogen from the liver by adrenaline. The effect of injection of a crude saline extract of the anterior pituitary on the blood-sugar response of the rabbit to insulin was also investigated by Cope and Marks.[6] After preliminary treatment of the animals with these extracts, insulin produced a greatly curtailed hypoglycæmia associated with a tendency for the blood-sugar to rise to a high level, very much as in our own experiments; with particularly potent extracts these effects were manifested within a few hours of injection. These findings have since been confirmed by Young,[9] whose diagram of the changes in the blood-sugar response of rabbits to insulin during the first hour after injection of Prolactin (an anterior pituitary product) bears an extraordinary resemblance to our own curve in Fig. 4.

The only work with which we are acquainted which bears directly on the question of the glycogenolytic substances in human serum is that of Anselmino and Hoffmann [10] which appeared shortly after we began our experiments. These authors claim to have demonstrated that serum from diabetics, when injected into rats, results in a marked diminution of the liver glycogen which reaches a maximum in 2–3½ hours. They made no determinations of the blood-sugar of their animals but claim to have found a considerable increase in the blood ketone bodies coincident with the fall in liver glycogen. The active substance was found to be present in all diabetics and without relation to the type or severity of the disease. The same substance was absent from normal human serum during fasting but appeared in response to carbohydrate feeding. Anselmino and Hoffmann believe the substance responsible for these effects is the same body as that which they have isolated from the anterior lobe of the pituitary.

While we have carried out a few experiments on the effect of injected diabetic plasma on the liver glycogen and the blood-sugar response to adrenaline in animals we are not, as yet, in a position to express an opinion on this aspect of the subject. Though we selected elderly, obese, hypertensive, glycosuric subjects as constituting a well-known clinical type, the only obese, non-hypertensive patient with glycosuria, whom we have examined, gave a positive response. It would seem, therefore, that hypertension is not an essential part of the syndrome. None of our patients who gave a positive response showed definite symptoms of pituitary dysfunction, with the possible exception of obesity, but in view of the known dissociation of pituitary symptoms we do not regard this as invalidating the hypothesis that their disorder was due to a disturbance of this gland. Though obesity in the Fröhlich syndrome is associated with increased sugar tolerance, a condition resembling that seen in the hypophysectomised animal, obesity in the Cushing syndrome is accompanied by a definite lowering of tolerance to sugar.

It may be pointed out that at the moment the position of the pituitary in the control of

EFFECT OF PRELIMINARY INJECTION OF PLASMA ON THE BLOOD-SUGAR RESPONSE TO 0·2 UNIT OF INSULIN INTRAVENOUSLY

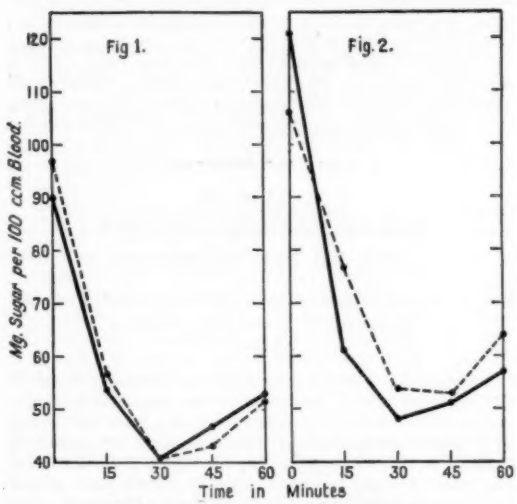
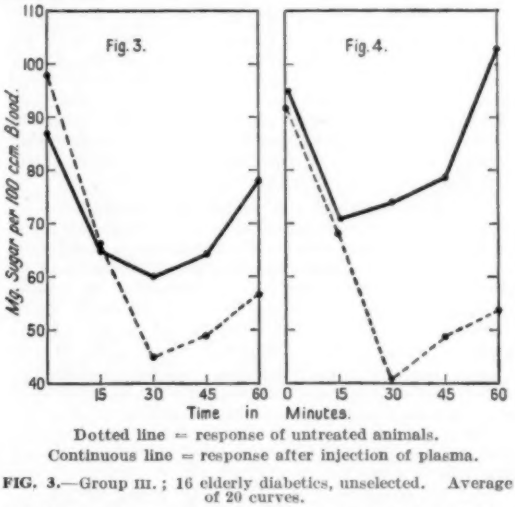


FIG. 1.—Group I.; 9 normal controls.
FIG. 2.—Group II.; 7 young diabetics.



Dotted line = response of untreated animals.
Continuous line = response after injection of plasma.

FIG. 3.—Group III.; 16 elderly diabetics, unselected. Average of 20 curves.

FIG. 4.—Group IV.; 6 members of Group III. giving positive response. Average of 10 curves.

carbohydrate and fat metabolism is obscure: from the literature it would seem that at least three principles are involved: (*a*) the glycogenolytic principle of Cope and Marks [6]; (*b*) the gluconeogenic factor of Soskin,[11] which controls the production of sugar from fat; and (*c*) a ketogenic factor described by Burn and Ling,[12] Anselmino and Hoffmann,[10] and others. The glycogenolytic and gluconeogenic principles are termed diabetogenic substances; there seems to be general agreement that the diabetogenic and ketogenic principles of the anterior pituitary are distinct bodies (see Collip [2] and Anselmino and Hoffmann [10]), a finding which has a possible bearing on the occurrence of glycosuria unassociated with appreciable ketosis in obese persons.

It is remarkable that injections of diabetogenic substances into animals do not immediately result in an elevation of the fasting blood-sugar level, although other signs of their presence are manifested. While Cope and Marks [6] found that an extract of the anterior pituitary in some instances raised the fasting blood-sugar to hyperglycæmic levels, Anselmino and Hoffmann [10] state that their purified extract had no definite effect on the blood-sugar; in Houssay's [4b] experience anterior pituitary preparations raise the blood-sugar only after a considerable latent period. In our animals the fasting blood-sugar was not altered by injection of positive sera.

Our knowledge of the metabolic disturbances in diabetes will undoubtedly be considerably extended as the thesis that the anterior pituitary gland and the pancreas act antagonistically in the control of carbohydrate metabolism is developed. It would appear that any alteration in the balance of these opposed influences must lead to abnormal carbohydrate metabolism. According to Houssay [14] the liver alone is essential for the manifestation of the diabetogenic action of pituitary extracts, and Soskin [15] has suggested a theory of the maintenance of the blood-sugar level based on the view that the pituitary and pancreatic factors act through the medium of the liver.

The significance of the low R.Q. characteristic of the diabetic condition has recently been called into question by Soskin.[3] Contrary to accepted opinion it would seem that the depancreatised dog, and, presumably, the human diabetic, is able to oxidise carbohydrate in a normal manner. The effect of the oxidation of carbohydrate on the R.Q. is, however, considerably masked by the simultaneous conversion of fat to carbohydrate, a process having a low R.Q.

Our finding that in certain cases of diabetes the blood contains a substance with a diabetogenic action is against the view that lack of insulin is always responsible for the disturbances of carbohydrate metabolism of the "diabetic." The close similarity between our results and those obtained by others with extracts of the anterior pituitary suggests that the blood of those of our patients who gave a positive response contained an excess of a factor capable of modifying the hypoglycæmic action of insulin in a manner resembling that of the anterior pituitary principle. Having regard to the relatively small volume (10 c.cm.) of plasma injected into the rabbits, the concentration of active substance in these bloods must have been very considerable.

SUMMARY

The blood plasma of some elderly, obese, glycosuric patients, when injected into rabbits, was found to diminish the hypoglycæmic action of insulin in a manner closely resembling that observed by other workers with extracts of the anterior pituitary gland. The plasma of young diabetic patients and of normal control subjects gave entirely negative results. The possible bearing of this finding on the pathogenesis of human diabetes is discussed.

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A CASE OF
ACUTE FEBRILE ANÆMIA
DUE TO DENTAL SEPSIS

By Paul C. Gibson, M.D., B.Sc., M.R.C.P. Lond.

PHYSICIAN TO THE TORBAY HOSPITAL

Nearly fifty years ago William Hunter remarked on the similarity between what he called *septic anæmia* and *Addison's anæmia*. He was convinced that they were distinct diseases, but he believed that in both, oral sepsis played a part; that in the one case the relationship was a direct one, while in the other it was indirect. During the past fifty years attention has been mainly directed to Addison's anæmia, and controversy has been keenest about its relationship to focal sepsis. The discovery in 1923, by Minot, of the special efficacy of liver, completely reorientated our ideas about this and other allied anæmias, emphasising the prime importance of a deficiency factor in this particular group. To-day the scene has shifted; for the moment the theory of Addison's anæmia has been satisfactorily shelved, and the centre of dispute is another group of anæmias, which, although called by another name, resemble in many ways the *septic anæmia* of Hunter. Whether or not focal sepsis plays a part in their causation is still a moot point, but the story of these anæmias is not yet finished, and, in the light of more perfect knowledge, it may be found that Hunter was right after all.

In the course of a discussion at the Royal Society of Medicine in 1933, Tidy [1] referred to cases of *acute febrile anæmia*, recalling the kind of nickname given them by Parkes Weber, "acute breakdown of the blood," a term that was not intended as a distinctive label, but which has nevertheless a useful implication suggesting a severe, passing anæmia of sudden onset. Among this group of febrile anæmias is the *acute hæmolytic anæmia*, to which Lederer [2 3] drew attention in 1925. The outstanding features of his cases were the acuteness of the development of the symptoms; evidence of very rapid erythrocyte destruction;

extreme regenerative activity of the bone-marrow; rapid recovery after therapy; and absence of sequelæ. In the succeeding years a considerable number of similar cases have been reported. Lederer himself remarked that the disease was not an infrequent one. A review by O'Donoghue and Witts [4] in 1932, of 36 cases, and a report by Joules and Masterman [5] in 1935, of 4 cases, makes it probable that the condition is more common than is generally supposed.

O'Donoghue and Witts are inclined to believe that the disease is a distinct clinical entity, but in regard to its pathology they say "the morbid anatomy of the disease is as suggestive of an infection as the clinical picture, but there is no convincing evidence that streptococci or other familiar micro-organisms are the cause." A constant feature of these cases is the absence of demonstrable micro-organisms from the blood. If we assume that streptococci or other familiar micro-organisms are the cause, it follows that the materies morbi must be a soluble toxin. If this is so, it is not surprising that the source of the toxin is often hard to find. Cryptic infections are the bane of medical practice, and they are likely to continue to be so until a satisfactory test is found (perhaps on the lines of the pathogen selective culture test) which will supply convincing evidence of infection by a particular organism, isolated from a suspected focus.

If the toxæmic state resulting from focal infection is indeed the primary factor in the causation of *acute febrile anæmia*, we must look for other factors to account for the differences that distinguish a particular group, such as the Lederer group, from other anæmias of septic origin. From the almost specific effect of blood transfusion in most of the reported cases it may be supposed that anoxæmia is such a factor. It seems as though, in the course of a toxæmic process which is affecting the blood and producing anæmia, when the available hæmoglobin falls below a certain critical level, a breakdown of the hæmopoietic system follows—such a state being often associated with a febrile reaction. It is believed that the actual stimulus to hæmopoiesis in anæmic states is diminished oxygen tension. Presumably if oxygen tension falls below a certain level the stimulant effect is succeeded by depression. If, as a further result of the toxæmia, the source of hæmopoietic factor is poisoned, the scene is set for the production of an anæmia of Addisonian type. To restore the balance of health, one or more of three methods of treatment might be expected to be effective: (1) reinforcement of the hæmoglobin supplies; (2) reinforcement of the natural supply of hæmopoietic factor; (3) elimination of the infection. Of all these methods, the swiftest and surest, in the average case, would be an adequate blood transfusion. It is to be expected that an adequate supply of liver or stomach extract would be equally efficacious in some cases. But, assuming that focal infection is at the root of the trouble, these can only be regarded as palliative remedies; the tracking down and suppression of the source of infection must be of primary importance.

It is interesting to recall the case of Exner and Ive,[6] reported in 1925, and another case reported by Venables [7] in 1926. In both of these, acute hæmolytic anæmia was associated with dental sepsis. In the case of Exner and Ive, after two blood transfusions had been ineffective, a third one, given after the mouth had been cleared of infected teeth, was dramatically successful. In Venables's case, blood transfusion was ineffective, dental extraction was considered inadvisable on account of the patient's condition, and a desperate situation seemed to be saved by the use of an autogenous vaccine prepared from a dental swab. In one of Lederer's six cases three transfusions of 500 c.cm. each were without beneficial effect; in fact the patient was worse after the third one, but she eventually recovered without any further treatment.

Case Record

The case that is the subject of this communication has much in common with those reported by Exner and Ive and by Venables.

HISTORY

Female, aged 23, domestic servant. Diphtheria at 4 years old. Jaundice at 14 and at about the same time she had two teeth extracted which was followed by a septic mouth and a septic toe. She was otherwise well until about two years before admission. She then began to get tired easily and found her work more and more of an effort. In March, 1934, she began to have pain in her left hip. After a week in bed the pain improved. She went home for six weeks, remaining more or less free from pain. Three days after starting work the pain returned and she was sent to St. Mary's Hospital, Paddington, for investigation. She went there on May 11th and attended as a surgical out-patient. She complained of pain in the left thigh, radiating to the heel, also of breathlessness on exertion and palpitation. It was considered that she was suffering from sciatica and she was transferred to the medical department. Radiograms of both hip-joints showed nothing abnormal, a group of calcium shadows appeared in the right pelvis which were thought to be calcified glands. Clinical examination showed that she was thin and pale and had very evident dental sepsis; temperature 98° F., pulse-rate 120. Nothing else was found wrong. She was sent to have dental treatment and told to report again afterwards.

In June she had four teeth extracted, after which her condition remained much the same. At the end of July she came to Torquay to recuperate. Shortly afterwards the pain became worse and the left shoulder became affected. She went to consult a doctor, walking some little way to his house. He noted that she was very pale and so sent her to the hospital for a blood count, telling her to come and see him again in a couple of days so that he might advise her in the light of the report. She did not come and when he called at her house he found her in bed very ill. He immediately sent her into the Torbay Hospital. She was admitted on August 17th, 1934.

By reference to the temperature chart the last illness can be divided into three phases: (1) A febrile phase, lasting for twelve weeks and two days. (2) An afebrile phase, lasting nine weeks and five days. (3) A final phase, also febrile, lasting five weeks and three days, which ended with her death, six months after admission. The accompanying Tables summarise the main features of blood counts and other special investigations and of the treatment adopted.

THE FIRST PHASE

At the time of admission she was thin and very pale. There was no suggestion of jaundice then, or at any time during the illness. The pulse-rate was 120, the temperature swinging from 97° to 103°. Nothing notable in the lungs. First heart sound blurred. Blood pressure 120/80. Spleen easily felt two fingers-breadth below the costal margin. There was pain in the left hip and shoulder-joints. The gluteal muscles on the left side were wasted. The urine contained neither albumin nor sugar. The blood showed a megaloblastic anæmia. Bacteriological and serological tests gave no evidence of a blood infection. It was thought that she had a primary anæmia and liver injections were started on Sept. 2nd.

On Sept. 15th her condition was steadily deteriorating and she was given a transfusion of 200 c.cm. of her father's blood. We could not be sure that he was of the same group, his cells were unaffected by her serum but her own

cells auto-agglutinated. There was a slight improvement after this and so, on Sept. 20th, she was given another transfusion of 250 c.cm. from the same donor. On the following day the red cell count had fallen still lower and no reticulocytes were seen. On Sept. 27th we detected what we took to be a presystolic thrill and murmur. She seemed to be dying and her parents were summoned to await the end.

Six days previously Ventriculin had been started. This was repellent to her and it was only by constant persuasion that she could be induced to take it. On Oct. 10th, encouraged by a rise in the reticulocytes, we increased the dose of ventriculin. It was found that 20 g. could be given in four large cachets. From this time onwards her condition progressively improved. The rapid improvement in her colour was very striking. Within four weeks the red cell count had reached 3 millions; at this point the fever abruptly ended and the first phase came to an end.

The salient features of this stage were the alternations in the clinical picture. At first she seemed to have a primary anæmia, and then the appearance of what we took to be a presystolic murmur, at the time when hæmatinic treatment had apparently failed, was very suggestive of infective endocarditis, while, later, the sudden improvement soon after ventriculin was added to the daily ration of liver seemed to point conclusively to Addison's anæmia.

TABLE I.—*Blood Counts*

Date.	Hb. per cent.	Rbc's (mills.)	C.I.	Wbc's (1000).	Polys. per cent.	Retics.	Immature cells in 200 Wbc's.
1934.							
Aug.							
14th.	37	3·13	0·59	3·0	62·5	0·75	2 meg. 5 norm.
21st.	..	..	..	2·7	58·0	..	..
31st.	25	1·25	1·0	1·3	60·5	0·2	3 norm.
Sept.							
3rd.	..	..	..	..	..	0·5	..
4th.	..	..	..	..	..	0·7	..
5th.	..	..	..	..	..	1·6	..
6th.	..	..	..	..	..	0·6	..
7th.	..	..	..	..	..	0·8	..
8th.	..	..	..	..	..	0·8	..
12th.	22	1·3	0·84	1·5	62·5	0·5	1 norm.
17th.	20	1·47	0·68	..	..	..	..
21st.	16	1·14	0·72	2·8	70·0	Abs.	..
25th.	22	1·33	0·84	2·1	68·0	1·2	..
Oct.							
1st.	..	..	..	..	..	1·0	..
4th.	..	..	..	..	..	1·0	..
6th.	15	1·14	0·68	..	..	..	..
8th.	..	..	..	..	..	4·6	..
11th.	20	1·34	0·76	2·2	60·0	5·0	4 norm.
15th.	..	..	..	..	..	4·5	..
18th.	..	..	..	..	..	6·0	..
22nd.	27	1·73	0·79	1·5	61·0	2·3	1 norm.
25th.	..	..	..	..	..	2·5	..
29th.	33	2·93	0·56	2·4	61·5	1·2	..
Nov.							
1st.	..	..	..	..	..	1·8	..
5th.	36	2·88	0·63	3·0	62·5	2·5	..
8th.	..	..	..	..	..	2·0	..
12th.	42	3·11	0·67	3·0	43·5	2·2	..
15th.	..	..	..	..	..	1·0	..
19th.	54	3·92	0·69	3·8	43·0	1·7	..
22nd.	..	..	..	..	..	1·9	..
26th.	60	3·95	0·75	6·3	66·5	2·1	..
29th.	..	..	..	..	..	1·5	..
Dec.							
3rd.	60	4·23	0·71	4·3	65·5	1·9	..
6th.	..	..	..	..	..	1·0	..
10th.	58	4·35	0·66	5·5	51·5	2·4	..
13th.	..	..	..	..	..	1·7	..
17th.	58	4·54	0·64	5·8	59·0	1·0	..
24th.	62	4·67	0·66	4·5	55·5	0·7	..
31st.	64	5·15	0·62	5·5	60·0	0·5	..
1935.							
Jan.							
7th.	63	5·12	0·61	6·1	62·5	0·4	..
14th.	68	5·41	0·62	5·5	59·0	0·8	..
21st.	66	5·5	0·60	3·5	49·5	0·4	..
28th.	62	5·96	0·52	3·5	62·5	0·6	..
Feb.							
4th.	65	4·75	0·68	3·3	63·0	0·3	..
11th.	66	5·23	0·63	4·5	67·5	0·6	..
18th.	60	4·77	0·63	6·0	81·0	0·4	..

Hb.=hæmoglobin; Rbc and Wbc=red and white blood-cells; C.I.=colour-index; polys.=polymorphonuclear leucocytes; Retics.=reticulocytes. Meg.=megaloblasts; norm.=normoblasts.

TABLE II.—*Special Reports*

BLOOD

1934.		
Aug. 21st	Widal	No evidence of agglutination found against members of the enteric group.
,, 22nd	..	Serum further investigated against *Brucella abortus* and *melitensis* with negative results.
,, 27th	..	No agglutination against *B. typhosus* O.
Sept. 3rd	Platelets	118,000 per c.mm.
,, 5th	Blood culture	No pathogenic organisms found.
Dec. 6th	Van den Bergh	Negative in both phases.

URINE

No sugar or albumin found throughout the course of her illness.

FÆCES

Aug. 24th .. Bacteriology .. No evidence of non-lactose-fermenting organisms found.

FRACTIONAL TEST-MEAL

A=Free HCl. B=Total acid.

Nov. 29th.	Fasting.	½ hr.	¾ hr.	¾ hr.	1 hr.	1¼ hrs.	1½ hrs.
A ..	0·046	0·088	0·200	0·119	0·109	0·190	0·120
B ..	28	39	72	46	43	72	56

No pus seen. A trace of blood in resting juice. Bile present in later samples. Starch absent in resting juice, present in all others. Mucus present throughout.

TEETH

1935.	
Jan. 5th. Report on radiogram	The radiological examination of the upper teeth shows them to be healthy, but there is a root tip remaining from upper right 8. In the mandible there are two partially absorbed roots of L.L. 7, while L.R. 5 looks to have an infected area in the alveolus consisting of a small abscess, in addition to some more generalised rarefaction of bone.
Jan. 16th Bacteriology	Pathogen selective and direct cultures show a *Streptococcus viridans*.

TABLE III.—*Treatment*

		Date in 1934.
Iron, arsenic, and strychnine	Intramuscular injections alternate days.	Aug. 18th to Sept. 2nd.
Campolon ..	Intramuscular injections, 2 c.cm. daily.	Sept. 2nd ,, Oct. 6th.
Liver extract ..	Oral—	
	1 dr. b.d.	Sept. 12th ,, Sept. 22nd.
	2 dr. b.d.	Oct. 17th ,, Nov. 10th.
	2 dr. t.d.s.	Nov. 10th ,, Nov. 24th.
	2 dr. 4 times	Nov. 24th ,, Dec. 12th.
	2 dr. t.d.s.	Dec. 22nd ,, Death.
Ventriculin ..	Oral—	
	10 g. daily	Sept. 22nd ,, Oct. 10th.
	20 g. daily	Oct. 10th ,, Dec. 12th.
Colliron ..	Oral—	
	1 dr. t.d.s.	Sept. 12th ,, Oct. 17th.
	2 dr. t.d.s.	Dec. 12th ,, Dec. 23rd.
Pil. ferri redact.	grs. 10 t.d.s.	Dec. 23rd ,, Death.

On Nov. 3rd it was recorded that the spleen was not felt and the first sound at the mitral area was clear. It was evident that we had been deceived by a doubled first sound. A reference from a paper by Poynton, Thursfield, and Paterson [8] on acute anæmia in children so exactly describes what occurred in this case that I feel justified in quoting it. They say:—

"As the anæmia progresses the first sound at the impulse becomes short and abrupt, and if in addition it is slightly reduplicated, the simulation of mitral stenosis is very close. We have not detected, in such cases, a definite thrill, but there is invariably a soft systolic murmur after the abrupt first sound. When the degree of anæmia is very profound, a diastolic murmur may become also evident at the base, with its maximum usually, just to the left of the sternum in the second intercostal space. When, in addition, there are fever, purpura and enlargement of the spleen, the resemblance to a progressive endocarditis is so close as to give rise to the greatest difficulty

in diagnosis. It is equally remarkable, when there is improvement in the anæmia, how completely these cardiac signs alter and return to normal."

THE SECOND PHASE

During the nine weeks that followed the abrupt cessation of the swinging temperature, she remained afebrile with the exception of four isolated rises, none of which lasted more than 48 hours. It was a period of steadily improving health. The blood count rose progressively and her weight increased from 7 st. 3 lb. on Nov. 20th to 8 st. 5 lb. on Dec. 29th. The results of a fractional test-meal and a van den Bergh test showed that she had a normal gastric acidity, and that there was no evidence of hæmolysis at the time of the test. And so the idea of Addison's anæmia had to be abandoned and the teeth again became suspect.

It was decided to wait, before having these dealt with, in order to get her as physically fit as possible. She was given massage, and, later, a course of ultra-violet light baths and she gradually resumed a normal life. About Christmas time arrangements were made for her to stay with friends to complete her convalescence. On Dec. 16th she began to complain again of pain in her shoulder and hip. On Dec. 23rd this was so severe that an injection of omnopon was needed to relieve it. Her general condition remained good. On Jan. 4th her teeth were radiographed. It was found that she had an apical abscess in one of her premolars and five other teeth appeared to be unhealthy. There was a brisk rise of temperature on the day following the X ray examination, which subsided after 48 hours. The pain continued and her weight began to fall and so it was decided that the infected tooth should be extracted. This was done under gas on Jan. 12th.

From the apex of the tooth a growth of *Streptococcus viridans* was obtained, both from a direct culture and from implantation into her own blood. A vaccine was prepared with which it was hoped to immunise her before proceeding to further extractions. One week after the extraction the swinging temperature returned and she entered on the final phase of her illness.

THE THIRD PHASE

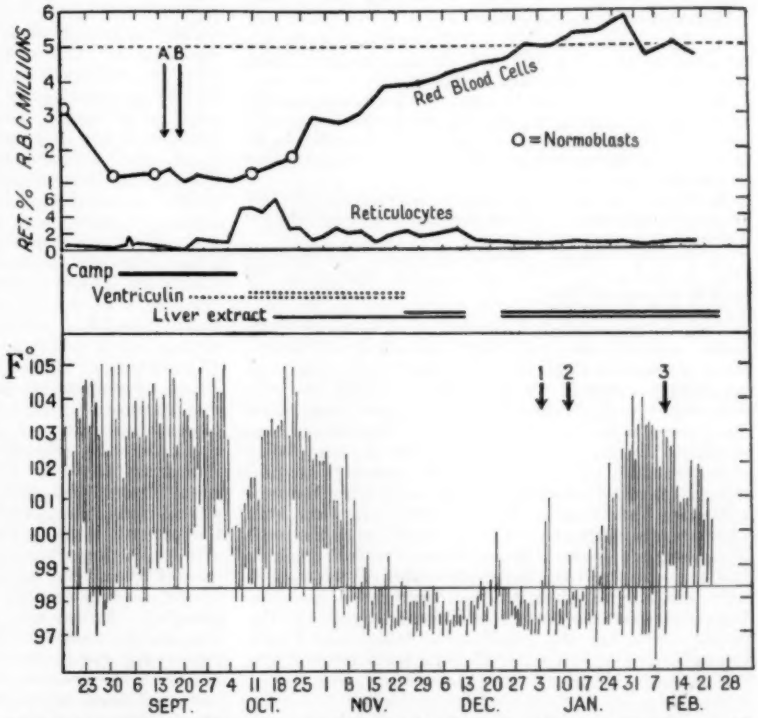
The beginning of the final phase, which started on Jan. 18th, coincided with the onset of the first menstrual period that she had had since her admission. During the succeeding week the temperature was not alarming and it was thought that it might be associated with menstruation. But her general condition deteriorated rapidly, the pain in her hip and shoulder was continuous and at times agonising.

On Jan. 26th, the vaccine being ready, she was given a subcutaneous injection of 50,000 organisms. During the succeeding 24 hours the temperature was subnormal. The same dose was repeated on Jan. 30th and on Feb. 1st without result. On Feb. 4th she was given 75,000, still without effect. The temperature was now swinging from 97° to 103°. We felt that there was no time to lose and decided to give her full doses of antistreptococcal serum and then to extract the suspected teeth. From Feb. 8th to 14th inclusive she was given, intramuscularly, 10 c.cm. of concentrated polyvalent antistreptococcal serum twice daily. On Feb. 9th the five suspected teeth were extracted. After this the temperature began to abate and we hoped that she was going to improve. On Feb. 10th she began to get serum reactions; she vomited frequently and a giant urticaria developed all over her body. These troubles added to the pain were becoming intolerable and so, on Feb. 15th, we stopped the serum. But it was soon evident that she was failing, the pulse-rate rose steadily, the liver became hard and enlarged (being palpable five fingers-breadth below the costal margin), there were crepitations at the bases of both lungs, and purpuric spots appeared on the abdomen.

On Feb. 24th she died, five days after the completion of her sixth month in hospital.

Conclusion

A peculiarly interesting feature of this case is the contrast presented by its initial and final phases. During the first phase the only symptom was extreme prostration, the pain was forgotten soon after admission. The dominating feature apart from pyrexia, which was common to both phases, was a grave anæmia. Although the heart sounds were altered there was no evidence of circulatory failure. During the final phase pain was the dominating



Showing temperatures, reticulocyte counts, and red cell counts accurately superposed. The maximum temperature range for each day is given, taken from four-hourly charts, except from Nov. 20th, 1934, to Jan. 27th, 1935, during which period morning and evening charts only were used. The dosage of the preparations referred will be found in Table III. Camp.=Campolon. A=Blood transfusion (200 c.cm.). B=Blood transfusion (250 c.cm.). 1=Radiogram taken. 2=One tooth extracted. 3=Five teeth extracted.

feature. The blood picture was normal and no alteration in the heart sounds was noted, but as the fever progressed her tissues were rapidly swamped by acute congestive failure.

The evidence that incriminates the *Streptococcus viridans* as the cause of death provides reasonable proof of the cause of the anæmia. It is extremely unlikely that the two febrile phases were related to essentially different causes. The presumption is that the first phase was one of the manifold effects attributable to streptococcal toxin, whereas the final phase was due to invasion of the blood and tissues by the organism itself. The acute onset, the rapid development of anæmia and its equally rapid subsidence, the megaloblastic reaction, and the extreme pyrexia remind one of the cases described by Lederer; but the absence of any evidence of hæmolysis excludes the use of the term acute hæmolytic anæmia. In the present state of our knowledge, admittedly very imperfect, it seems advisable when referring to this type of anæmia to avoid too precise a nomenclature. In attempting to define a new type it is desirable to explore the common ground thoroughly before emphasising points of difference.

There are two features of this case that are of special interest: that it was a true anhæmopoietic anæmia, and that it was caused by dental sepsis. To justify the first contention it will be necessary to show that the response to specific substance was of the same order as occurs in Addisonian anæmia. Minot and Castle [9] have recently summarised the essential features of the reticulocyte response to specific substance in pernicious anæmia. The points of interest to us are as follows:—

1. The reticulocyte response that follows the giving of active substance to cases of pernicious anæmia almost always begins within two to ten days.

2. If, following the administration of a substance during a first period, there is, during a second period, an orderly response of reticulocytes, no matter of what degree, to a second substance, this substance is known to be more potent than the first.

3. There is a direct relationship between the amount of specific substance given and the peak of the reticulocyte value.

4. The daily dose of liver or desiccated hog stomach that is needed to produce a maximal response is 500 and 30 g. respectively.

Daily intramuscular injections of 2 c.cm. of Campolon—that is, the equivalent of 500 g. of liver—were started on Sept. 2nd. Except for a low peak reaching a value of 1·6 per cent. on Sept. 5th the reticulocytes diminished steadily, and on Sept. 21st they were reported as "absent." Ventriculin was started on Sept. 22nd, the initial dose, 10 g., being only one-third of that considered necessary to produce a maximal response. Three days later the reticulocytes had risen to 1·2 per cent. On Oct. 11th normoblasts reappeared in the blood and the reticulocytes had risen to 5 per cent., the first peak in the curve. On Oct. 10th the dose of ventriculin was doubled; eight days later the reticulocytes had increased to 6 per cent., the second peak on the curve. Applying the principles of Minot and Castle it would seem that ventriculin was more potent than liver. While it is likely that the extent of the reticulocyte response was affected by the fever, it cannot be maintained that the eruption of normoblasts and the improvement in the red cells were attributable to this cause. The red cell count began to improve on Oct. 6th, when the fever had abated, but the progressive improvement in the blood was entirely unaffected by the six weeks of fever that followed this temporary remission. It seems, therefore, that, in this case of febrile anæmia, ventriculin exerted its specific effect, and that this effect was of the same order as would be expected in a case of pernicious anæmia.

We have now to consider the second contention, that the illness was due to dental sepsis. It is unfortunate that a blood culture was not taken during the final phase and that a post-mortem examination was not done, but the clinical evidence alone is sufficiently convincing. Dental sepsis had marred her life from the age of 14, when she developed a septic mouth and septic toe after the extraction of two teeth. In May, 1934, when she was investigated at St. Mary's Hospital, it was thought that her pain was accounted for by sciatica, due to very obvious dental sepsis. During her last illness, immediately after her teeth were radiographed, there was a brisk febrile reaction, suggesting that the local tissues were damaged by the X rays, so facilitating the escape of organisms or their toxins into the blood. The X rays revealed an apical abscess in a premolar, which was extracted. Following this, after a latent period of seven days, there developed, with sudden onset, a condition that was indistinguishable from septicæmia. The accumulated value of this evidence should be as convincing as would have been the demonstration of a streptococcus in the blood.

By way of a corollary it seems appropriate to emphasise the risk attending the extraction of septic teeth. The fact that a scraping from the apex of an infected tooth, implanted into her own blood, yielded a growth of *Streptococcus viridans* is of some significance. It was an application of the pathogen selective culture test. E. C. Lowe,[10] applying this test to specimens from infected teeth, found in 57 per cent. of his cases, while the direct cultures yielded multiple types of growth, a pure growth of streptococci was obtained from the auto-blood cultures. The significance of the test is that it implies the ability of a particular organism to grow in the patient's blood, whereas other organisms not pathogenic to the patient are unable to do so. Supplementing this observation are the findings of C. C. Okell and S. D. Elliott.[11] These authors found that within a few minutes after the extraction of teeth from obviously septic mouths a transient streptococcal bacteriæmia, lasting a few minutes, was observed in 75 per cent. of their cases. These two observations taken together afford an explanation of the many fatalities, recorded and unrecorded, that have followed the extraction of septic teeth. If these findings are generally applicable they should serve as a serious warning, indicating that, in patients whose resistance has been lowered by prolonged illness, the extraction of infected teeth, without previous preparation of the patient, is an operation fraught with grave risk. What this preparation should be is suggested by the case of Venables,[7] in which a vaccine prepared from a dental swab seemed successful in suppressing the infection. In our case, action was forced by circumstances, the pain was incessant, and it seemed imperative to remove the suspected teeth in order to relieve it. With the greater courage of conviction we might have persisted with vaccine treatment with better effect. But conviction can only come of knowledge and, in dealing with focal infections, without means at our disposal for identifying the offending organism with any degree of certainty, we are still left to grope in the dark.

I wish to express my thanks to Dr. W. D. Brooks, medical registrar to St. Mary's Hospital, for a most helpful report, and to Dr. T. C. Hunt and Mr. C. W. G. Bryan, physician and surgeon respectively to the out-patient department at St. Mary's, for their kind permission to make use of this report. I would also acknowledge the valuable help received from Dr. H. A. Fielden and Dr. Basil Halliwell, pathologist and radiologist respectively to the Torbay Hospital, for various investigations.

I particularly desire to record my gratitude and indebtedness to Sister Tozer of the Torbay Hospital for her invaluable help in ensuring the accuracy of the temperature charts and of the details of treatment, and to Mr. Horace Mountford, Dr. Fielden's assistant, who was responsible for all of the blood counts. Without their help it would have been impossible to have collected reliable data for this publication.

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DECLINE AND FALL OF THE UNDESCENDED TESTIS

BY EDWARD MCLELLAN, M.B. Lond., F.R.C.S. Eng.

SURGICAL REGISTRAR, HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET, LONDON

NOTHING could encourage the enthusiastic investigator in the happy exercise of self-deception more than an inquiry into this subject, which has exercised the imagination and ingenuity of embryologists, biologists, anatomists, and surgeons for generations.

Theories abound on the cause and course of the descent of the testis, and few of them are supported by anything which resembles scientific proof. This is not surprising inasmuch as theory has been based upon embryological evidence, and this, in the human at any rate, is inevitably incomplete.

Recently a certain amount of valuable investigation has been carried out from the clinical standpoint by Spence and Scowen,[1] who have been able to effect the descent of the testis by the use of gonadotropic hormones, but no explanation of their results has been forthcoming, nor has it been possible to state which cases are suitable for this form of treatment and which are not.

At the Hospital for Sick Children, Great Ormond-street, I have had the opportunity of investigating 25 cases of undescended testis over a period of eighteen months, and in this paper I propose to make observations upon the following matters: (1) the normal descent of the testis and the processus vaginalis, and their relation to one another; (2) the types of undescended testis from the clinical standpoint; (3) an explanation of the satisfactory effect of Pregnyl in certain cases and not in others; and (4) the unsatisfactory late results of operative treatment and a suggested remedy.

NORMAL DEVELOPMENT

Many factors have been described as contributing to the descent of the testis: the disappearance of the cephalic end of the mesonephros causing a relative caudal descent; the return of the gut from the cord to the abdomen thus separating further the anterior from the posterior wall; the contraction or atrophy of the gubernaculum. All these play their part, but to them must be added two other factors which I believe to be of paramount importance: the testis must be of normal size, weight, and development, and its descent must be preceded by a normal descent into the scrotum of the processus vaginalis.

It is now known that the testis descends along the course laid down for it by the processus vaginalis, and in my opinion failure to descend may be due to:

(*a*) A small, undersized, underactive testis.

(*b*) An abnormal processus vaginalis.

(*c*) The development of adhesions between testis and adjacent structures during its descent.

The gubernaculum acts as a guide in the descent, but I cannot believe that it plays an active part in drawing the testis down. It is possible in any male infant to displace the testis from the bottom of the scrotum to the external abdominal ring, and frequently into the inguinal canal, with the greatest of ease; and this would not be possible if the testis were in any way anchored to the bottom of the scrotum by a contracted or atrophied gubernaculum.

Keith's original description of the testis descending with the processus vaginalis "like a log on a sledge" has been accepted without question, but there is evidence, both embryological and clinical, that the descent of the processus vaginalis precedes in time as well as situation that of the testis.[2] From an examination of embryological sections, for which I am very greatly indebted to Dr. R. J. Gladstone of King's College, it is clear that the path which the processus vaginalis is to take is made plain by a dissolution of the cells, a cleavage of the tissues leaving a space which the processus then occupies. Kirk [3] has shown clearly, by a very full and painstaking research, that the same is true in rabbits and marsupials, and that the processus vaginalis is completely formed and is in the scrotum long before the testis has descended.

What causes the cleavage of the cells and the descent of the processus vaginalis? It is not unreasonable to suppose that the stimulus is hormonic and of an œstrogenic nature. Harold Burrows [4] in a most excellent investigation has proved that in mice it is possible to produce inguinal herniæ at will by the administration of œstrin, provided the testes were almost or quite mature. He has also shown that œstrin tends to inhibit the descent of the testes and prevent their maturation.

Now it is clear from the work of Zondek [5] that during the early months of pregnancy the œstrin content of the maternal blood is very low, and that towards the end of pregnancy it rises rapidly, while the anterior pituitary secretion remains at a relatively high level throughout and falls slightly towards the end. Suppose that this state of affairs is disturbed and there is an excess of œstrin or a relative lack of anterior pituitary substance during pregnancy. The result may easily be the development in the male fœtus of a normal or greater than normal processus vaginalis, together with small and underdeveloped testes. The combination of these circumstances may be responsible for the imperfect descent of the testes.

If these views are correct it follows that there is a stage in the development of every male child when the processus vaginalis reaches the bottom of the

scrotum and the testis is still in the pelvis or in the inguinal canal, and a potential hernial sac is present. What then causes the closure of this sac? It is common ground that the processus first closes at the internal abdominal ring and later at the external abdominal ring. It is also agreed that the testis pauses in its descent at the internal abdominal ring for about three months (4th to 7th) and at the external ring for one month (8th). If we bear in mind that the fœtus is in an attitude of flexion with the thigh in contact with the abdominal wall it follows that considerable pressure must be made on the testis as it lies at these points of pause. The result may well be that which we hope to obtain clinically by applying a wool truss to a similar point after the birth of the infant in an attempt to cure an inguinal hernia. The pressure in the antenatal state is, however, applied more accurately and more consistently, and the result is equally more effective.

There may be a hormonic factor in addition to the purely mechanical one. If œstrogenic hormones have the effect of increasing the processus vaginalis it is possible that antagonistic hormones of the anterior pituitary group have an obliterative effect, and mention will be made of this in the clinical study later.

DEFINITION AND CLINICAL CLASSIFICATION

A testis may be said to be undescended if, after painstaking and persistent attempts have been made to push or pull it down into the scrotum, it remains at a higher level at some point on its normal course of descent.

For examination I place the child lying on a couch, with the legs slightly apart and slightly flexed, and with the abdominal muscles relaxed. I then attempt to press the testis downwards along its course by slow and firm and steady pressure, commencing this movement as high as the iliac fossa. If after repeated attempts the testis fails to enter the scrotum it is considered to be undescended. The importance of this examination will be apparent when I say that no less than 12 patients with "undescended testis" were sent to me for treatment by practitioners who all had special experience in the examination of children, and in all I was able to get the testes satisfactorily into the scrotum. These call for no treatment and will with certainty descend in the course of time. With a less energetic examination technique they would certainly have found their way into the "cures" column of the pregnyl treatment table.

Clinically my cases can be classified as follows:—

Group.	General physical development.	Development of testis.
I	Normal.	Normal.
II	Subnormal.	Subnormal.
III	Normal.	,,

The results of pregnyl treatment in these cases according to the various groups are shown in the Tables.

In addition to these groups there were three patients in whom an operation had been performed in the inguinal region, and all three failed (Table II.).

The injections were given once a week and the dose was 500 rat units, given intramuscularly into the buttock. There was an interval of 2 to 3 months after each course of six injections. My idea was to make the testis descend as slowly as possible in the hope of causing an obliteration of the processus vaginalis, in the manner similar to that which I believe to occur normally during the later months of intra-uterine life. In only one of the 25 boys that have been so treated is there any hernia that can be recognised clinically although there is a history of hernia in 4. This is a matter which calls for further investigation and which I am undertaking.

TABLE I.—*Summary of Results*

Group.	Type.	Cases.	Result.
I	Unilateral.	5	Failed.
II	Bilateral.	6	Cured.
	Bilateral, c hypospadias.	2	,,
	Unilateral.	3	,,
III	Unilateral.	3	,,
	Bilateral.	3	Improved.

TABLE II.—*Results of Treatment with Pregnyl*

Group.	Case	Age	Unilateral and bilateral.	*a.* General physical development. *b.* Development of testis.	Injections.	Result.
I	1	10	Unilat.	*a. b.* Normal.	18	Failed.
	2	1			10	
	3	5			16	
	4	8½			12	
	5	6¼			10	
II	6	10	Bilat.	*a. b.* Subnormal	4	Cured.
	7	1½			4	
	8	7			3	
	9	4½			3	
	10	9½			6	
	11	4			9	
II	12	5½	Bilat.	*a. b.* Subnormal.	4	Cured
	13	7			11	
II	14	5	Unilat.	*a. b.* Subnormal.	14	Cured.
	15	3½			7	
	16	3½			5	
III	17	8½	Unilat.	*a.* Normal. *b.* Subnormal.	5	Cured.
	18	7½		*a.* Normal.	7	
	19	6½		*b.* Doubtful.	4	
III	20	4½	Bilat.	*a.* Normal.	12	Imp.
	21	5½		*b.* Subnormal.	8	
	22	9½			8	
III	23	6½	Unilat.	*a. b.* Normal.	8	Failed.
	24	2½	Bilat.	*a. b.* Subnormal.	15	
	25	7½	Unilat.	*a. b.* Normal.	8	

Observations.—Cases 12 and 13: hypospadias; Cases 23 and 25: orchidopexy; Case 24: double herniotomy. Imp.=Improved.

It appears from my series that cases in Group I are entirely unsuitable for treatment by pregnyl, those in Group II are eminently suitable, and those that come into Group III may or may not respond favourably.

It is, naturally, very difficult sometimes to say whether the testes are small and undeveloped for the size of the boy but in my opinion these doubtful cases are worthy of a trial. No harm, at any rate, will be done and an operation may be saved. I have experienced no alarming reactions from these injections and there are no contra-indications (other than that of expense) in healthy children. There is occasionally slight stiffness of the buttock for a day or two, and two children developed a rash after each course of injections; it only lasted a few days. Parents often volunteer the information that the boys improve in health and general development during their treatment.

EXPLANATION OF RESULTS

It is obvious that the type of case which responds to pregnyl (Groups II and III) is that which also

comes under the heading (*a*) and (*b*) in the classification given earlier in this article; during intra-uterine life he may have been subjected to an excessive amount of œstrin or a deficient amount of anterior pituitary substance. By administering pregnyl we simply remedy, at a late stage, this state of hormonic imbalance, with the result that the testis develops, becomes larger, heavier, more mobile, and more readily follows the course which has been prepared for it by the processus vaginalis. This change in the physical condition of the testis is a most noticeable and constant feature.

The failures (Group I) are the cases which occur under the heading (*c*)—namely, normal testes in normal children, which have been arrested in their descent by adhesions to other structures in the abdomen or inguinal canal. It is the rule to find, when operating on these children, that great difficulty is experienced in dissecting the testis free from the structures in its vicinity.

LATE RESULTS OF ORCHIDOPEXY

I have recently carried out an investigation of 15 cases of undescended testis which were operated upon by the late Mr. H. Tyrrell-Gray at the Hospital for Sick Children, Great Ormond-street, between five and ten years ago. In every case the testis was still in the scrotum, a testimony to the perfect technique of a brilliant operator, but in every case the testis was considerably smaller than its normal neighbour. The same condition has been noted by Burdick and Coley [6] in a very much larger series.

I would therefore suggest that in those patients with undescended testis that belong to Group I, and who undoubtedly call for operative treatment, a pre-operative and a post-operative course of pregnyl should be given. The pre-operative course of, say, six injections will bring about some increase in the size of the testis, and this will facilitate the operation, while the post-operative course of, say, twelve injections will do something to prevent the atrophy of the testis which is such a constant feature.

I am greatly indebted to Mr. Eric Lloyd and Mr. Simpson Smith who have referred all these children to me and have thereby made this investigation possible. I am also grateful to the Organon Laboratories for supplying the hospital with pregnyl.

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MORE HOSPITALS FOR ESSEX.—Schemes for the erection of new hospitals by the Essex county council at Chelmsford, Saffron Walden, Colchester, and in the Thames-side district were outlined at a meeting of the county council at Chelmsford on April 8th. The Hospitals' Survey Committee are in consultation with Chelmsford Voluntary Hospital and it is hoped to raise the accommodation of the hospital to a maximum of 200 beds. There is a waiting-list here of 239 patients apart from adenoid and tonsil cases. At Saffron Walden it is suggested that the acutely sick should be dealt with by arrangement with the voluntary hospital. Sixty beds are needed for chronic cases and a site for such a hospital will have to be found. At Colchester the Pope's Lane Infirmary and the Stanway Infirmary will be united and will be in no way a rival to the Essex County Hospital.

ON THE TREATMENT OF UNDULANT FEVER WITH FOUADIN

BY CHARLES ZAHRA NEUMANN, B.Sc., M.D. Malta

THE intensity and duration of undulant fever vary so much that it is hard to assess the curative value of drugs used in its treatment. Sometimes the illness lasts only ten or fifteen days and causes but little inconvenience; but on the other hand it is common to see patients ill for eight or ten months or even longer, reduced to living skeletons and suffering from the after-effects for perhaps another six months. The temperature, too, may never rise above 100° F. in some cases, whereas in others the hyperpyrexia and delirium give a clinical picture very similar to that of severe typhoid fever.

Several classifications for the different clinical manifestations of undulant fever have been proposed, such as the distinction between an acute type and a chronic. It is not unusual, however, for the acute illnesses to become chronic or for the latter to suddenly flare up into acute. Alternatively the fever may, for no apparent reason, disappear, and rapid recovery may set in; and if a drug has been administered at this period it may easily be given credit which it does not deserve. This illustrates the difficulties inherent in any inquiry into the effect of therapeutic agents used in this disease.

Through the courtesy of the I.G. Farbenindustrie I have been able to treat eight cases of undulant fever with Fouadin, and the results are described below.

Fouadin is a complex compound of antimony and pyrocatechin-disulphonic acid. Pyrocatechin (which is related to adrenaline) is easily oxidised and therefore many of its compounds are unstable. The acid derivatives of pyrocatechin are much more stable, and several metallic complexes have been synthetised by Prof. Hans Schmidt since 1922. Fouadin is antimony bis-pyrocatechin di-sodium sulphonate, and the metal is trivalent. Being non-irritant, it can be injected intramuscularly, and has been widely used in Egypt and in other countries against bilharzia infestations. It is usually injected into the gluteal region, and to adults 1·5 c.cm. has been given on the first day, with 3·5 c.cm. on the second day, followed by 5 c.cm. on alternate days. There is no pain at the site of injection and the drug is well tolerated, no secondary effects having been observed. The above doses are suitable for an average adult male, but the maximum dose in the female patients has been 4·5 c.cm.

CASE 1.—A woman aged 23. She was treated at first with anti-melitensis vaccine, both intramuscularly and intravenously. The shock accompanying the intravenous injection was so intense that it was thought advisable not to persist. A fortnight after the onset the temperature was oscillating between 102° and 103° F. and fouadin was injected according to the scheme described above. On the seventh day, after the fourth injection, the temperature ranged between 99° and 100° F. At the eighth injection the patient was afebrile and no further waves of fever were afterwards experienced. During convalescence rheumatic pains made their appearance but were moderate in severity and not unduly troublesome.

CASE 2.—The patient, aged 18, had been suffering from fever reaching 105° F. for about eight days when the practitioner was called in. His spleen was found to be enlarged and the Widal reaction was positive to *Micrococcus melitensis*. Fouadin was injected in the usual

manner and at the fifth injection the temperature returned to normal, while the general condition improved so quickly that the patient returned to his work about three weeks after treatment was begun.

CASES 3 and 4.—Two brothers, aged 9 and 11, had been suffering from undulant fever for about a week before treatment was begun. The adult dose was divided between them. The evening temperature was 104° F. in both cases when the injections were started, but at the end of ten days both children were apyretic, each having received a total of five injections. During convalescence, which was otherwise uneventful, rheumatic pains made their appearance; but these were slight and lasted only a week.

CASE 5.—A man of 21 developed a severe toxic form of undulant fever and at the end of the first week his temperature rose to 105° F. He was delirious and the urine contained a small quantity of albumin but no casts. Bronchial catarrh caused a distressing cough with viscid whitish expectoration. It was thought advisable not to exceed 4 c.cm. fouadin per single dose owing to the possibility of causing renal irritation, and treatment was begun as soon as the diagnosis was confirmed by agglutination tests. After three injections the temperature was 103° F. in the evening, and on the twelfth day it had dropped to 101° F., while the general condition had improved considerably. The delirium had disappeared and the appetite was returning. On the seventeenth day the evening temperature was 99° F. and the injections were discontinued, the patient having had a total of nine injections. After three weeks he was completely apyretic and he remained so even on the supervention of slight rheumatic pains about the ankles and the knees. No secondary waves of fever were afterwards registered and the patient returned to work seven weeks after the onset of the disease.

CASE 6.—A boy aged 7. This was a slight case, for the temperature was never above 101° F. and the general condition was fairly good. Only three injections of fouadin were given (1·5, 2·5, and 4 c.cm.). At the end of a week the temperature had dropped to normal, although the patient developed arthritis of the hip-joint. This complication, although not accompanied by fever, lasted for almost a month.

CASE 7.—A girl aged 13. The onset of the disease was very insidious and suggestive of tuberculosis. The child coughed slightly, expectorated a little, and lost weight as well as appetite. An evening temperature of 100°–101° F. made the diagnosis of tuberculosis plausible, but radiographic examinations were negative and no tubercle bacilli were found in the sputum. The fever abated for about a week but then again rose to 102° F., and when it was found that the serum reacted strongly to *Micrococcus melitensis* in high titres the case was recognised as one of undulant fever. Fouadin was given as in the previous case and after five injections on alternate days the evening temperature dropped to 99° F. On the twelfth day the patient was afebrile. The appetite improved, the evening sweats ceased, and she gradually regained weight.

CASE 8.—A married woman of 32 contracted undulant fever at the eighth month of gestation and was delivered of a normal baby 15 days before the appointed time. On the day of the delivery the temperature rose to 104° F. and three days later it was still 103° F. At this stage fouadin was injected. At the fourth injection the patient's temperature was normal and she recovered completely within two weeks. Incidentally the baby's serum was tested and found not to agglutinate the micrococcus, although the mother's serum reacted in high dilutions.

The number of cases here recorded is too small for any definite conclusion, but further investigation into the action of antimony compounds on the disease seems desirable. In the treated cases there were no waves of fever after the first, although such waves are one of the characteristics of the disease. Fouadin does not appear to influence the onset of certain complications or sequelæ, such as arthritis.

Malta.

STAPHYLOCOCCAL LEUCOCIDIN
(NEISSER-WECHSBERG TYPE) AND
ANTILEUCOCIDIN

BY JOYCE WRIGHT, B.M. Oxon.

(*From the Wellcome Research Laboratories, Beckenham, Kent*)

DURING recent years there has been renewed interest in the properties of staphylococcal toxin and antitoxin; but, presumably owing to the practical difficulties of working with leucocytes, little experimental investigation has been undertaken on their leucocidal and antileucocidal properties.

The action of staphylococcal toxins on leucocytes may be demonstrated by—

(*a*) The "bioscopic" method of Neisser and Wechsberg (1901), which depends on the observation that, whereas freshly obtained leucocytes reduce methylene-blue to its colourless form under partially anaerobic conditions, similar leucocytes previously treated with toxic filtrates of staphylococci fail to do so.

(*b*) The microscopic method of van der Velde (1894), who found that, both in vivo and in vitro, staphylococcal toxins cause degeneration of the leucocytes of the rabbit.

(*c*) The microscopic method of Panton and Valentine (1932), who observed similar destructive action on human leucocytes.

The "Panton-Valentine leucocidin" is different from the α-hæmolysin (Valentine, 1936) and would thus appear to be different from the toxin which, as here described, destroys the power of the rabbit leucocytes to reduce methylene-blue ("Neisser-Wechsberg leucocidin"). The latter is referred to for convenience as N.W.L. N.W.L. and anti-N.W.L. are the subject of this investigation, with special reference to their relationship to hæmolysin and antihæmolysin.

TECHNIQUE

The method is a modification of the Neisser-Wechsberg technique, and is carried out with ordinary sterile precautions.

Reagents.—The following reagents are required:—

Aleuronate (*5 per cent.*) + *potato starch* (*3 per cent.*) in disodium phosphate (0·2 per cent.), steamed half an hour, after which the pH should be 7 to 8. (Aleuronate obtained from R. Hundhausen, Stärkefabrik, Hamm-in-Westfalia, Germany.)

Sodium citrate (*1 per cent.*) in saline (0·85 per cent.), steamed half an hour.

Locke-Lewis fluid (NaCl 0·90 per cent., glucose 0·10 per cent., KCl 0·042 per cent., $CaCl_2$ 0·024 per cent., $NaHCO_3$ 0·05 per cent.), candled through Berkefeld "N" filter.

Methylene-blue (*Grübler*).—Stock aqueous solution 1 in 250, steamed half an hour prior to use; diluted to 1 in 5000 with Locke-Lewis fluid freshly for each test. (All salts used were A. R. reagents (B.D.H.))

Sterile vaseline.

*"Standard" toxin, B.*8750 (0·5 per cent. phenol).*—A toxin of *a*-hæmolytic type prepared by combined use of modification of Parker's broth and Burnet's agar (Parish and Clark, 1932) from staphylococcus Wood 46.

"Standard" antitoxin, "K" (=*B.*8760) (0·3 per cent. T.K.E.).*—Unconcentrated antitoxin (horse) of anti-*a*-hæmolytic type. (Both "standard" preparations were those recommended for use in the clinical investigation of anti-hæmolysin in human sera (Parish, O'Meara, and Clark, 1934).)

Experimental staphylococcal filtrates.—Prepared by the same method as "standard" toxin, B.8750.

Experimental staphylococcal antitoxins.—Rabbit, horse, and human.

Leucocyte-suspension.—Leucocytes obtained by intrapleural injection of aleuronate + starch suspension, whole technique being performed with sterile precautions. For each test (usually about six toxins or antitoxins) eight rabbits injected. Fur over the thoracic region removed by fine clippers, rabbit lightly anæsthetised with ether, skin treated with iodine, and incision made through skin, subcutaneous tissues, and superficial muscles in the thoracic region just below the scapula. Cannula pushed carefully between the ribs into the

* It was found that these preservatives were not in themselves leucocidal at the dilutions used.

pleural cavity and 10 c.cm. of aleuronate + starch suspension injected. Needle withdrawn and incision covered with adhesive plaster. Eighteen hours later rabbits killed by intravenous injection of 10 c.cm. of air. Both pleural cavities opened with scissors, for, although injections made into one pleural cavity only, as good an exudate frequently found in the other. Non-hæmorrhagic exudates pipetted into tubes containing 10 c.cm. of 1 per cent. sodium citrate in saline; after pooling, centrifuged at low speed for 5 minutes, and leucocytes resuspended in Locke-Lewis fluid in boiling tube. Cells retain reducing power throughout the day if aerated at frequent intervals through pipette, and keep better at room temperature than at 37° C. Cell counts of suspensions were approximately 40,000 leucocytes per c.mm., about 92 per cent. being polymorphonuclear.

Preliminary Test for Minimal Reducing Power of Leucocytes.—Into a row of test-tubes (10 cm. by 1·0 cm.), 0·4, 0·35, 0·30, 0·25, 0·20, 0·15, 0·10, 0·05, and 0·00 c.cm. of leucocyte-suspension were pipetted, the volume in each tube being adjusted to 1·0 c.cm. with Locke-Lewis fluid. 0·1 c.cm. of methylene-blue 1 in 5000 was then added to each tube. The contents were thoroughly stirred with a wire loop, a vaseline seal being added finally. The tubes were incubated for 1 hour at 37° C. and the smallest amount of leucocyte-suspension to produce full reduction was noted. Twice this volume was used as the dose of leucocyte-suspension in the actual test.

Titration of N.W.L. in Toxic Filtrates.—"Doubling" dilutions of the toxin in Locke-Lewis fluid were made, the volume in each tube being 0·5 c.cm. The test dose of leucocyte-suspension was added, and the volume, if not then 1·0 c.cm., adjusted to that amount with Locke-Lewis fluid. The tubes were incubated for one and a half hours at 37° C., and 0·1 c.cm. methylene-blue was added to each. The contents were stirred with a wire loop, and each tube was sealed with vaseline and incubated for a further hour at 37° C., when readings were made. The minimal leucocidal titre was taken to be the least amount which produced complete leucocidal action—i.e., the amount present in the last tube in which the methylene-blue remained completely blue.

For purposes of comparison similar dilutions of "standard" toxin, B.8750, were included in each test series, as well as the following controls with methylene-blue: (*a*) leucocyte-suspension alone; (*b*) toxins alone, without leucocyte-suspension; and (*c*) leucocyte-suspension + uninoculated medium, which had been incubated and filtered as in the preparation of staphylococcal filtrates.

Titration of Anti-N.W.L. in Antitoxic Sera.—"Doubling" dilutions of the antitoxin to be tested were made in Locke-Lewis fluid, the volume in each tube being 0·25 c.cm. 0·25 c.cm. of "standard" toxin, B.8750, diluted 1 in 20, was added to each tube. The contents were then mixed, and incubated at 37° C. for half an hour. The test dose of leucocyte-suspension (see above) was added to each tube and the volume in each, if not then 1·0 c.cm., adjusted to that volume with Locke-Lewis fluid. The contents of the tubes were mixed and incubated at 37° C. for one and a half hours. 0·1 c.cm. methylene-blue 1 in 5000 was added to each tube. The contents were thoroughly stirred with a wire loop, each tube being sealed with vaseline and again incubated. It was found that the presence of serum so accelerated the reduction of methylene-blue by leucocytes that it was difficult to fix a definite time limit for this further incubation. In each test series were included therefore dilutions of "standard" antitoxin "K," and the whole test was read when dilution 1 in 400 of "standard" antitoxin showed complete reduction (white) and dilution 1 in 800 showed no reduction (blue). The end-point for each antitoxin was taken as the least amount which completely neutralised "standard" toxin, B.8750, diluted 1 in 20—i.e., in which complete reduction of methylene-blue occurred. Readings were usually "clear-cut" and easy to make after 20 to 30 minutes.

It has been customary, in the absence of a "unit" of anti-N.W.L., to express the potency of sera in terms of "standard" antitoxin "K."

Hæmolysin Titrations.—The minimal hæmolytic dose of staphylococcal toxins was determined by preparing a series of "doubling" dilutions, 0·5 c.cm. in each tube, and adding 0·5 c.cm. of saline to each. To determine (*a*) the α-hæmolysin, 1·0 c.cm. of 2 per cent. washed rabbit red cells was added to each tube, the contents being then mixed, and readings taken after one hour's incubation at 37° C. The minimal hæmolytic dose was taken as the least amount of toxin to produce complete hæmolysis; (*b*) the β-hæmolysin, 1·0 c.cm. of washed sheep cells was added to each tube, the contents being mixed, and readings taken after one hour's incubation at 37° C. and one hour at room temperature.

Antihæmolysin Titrations.—The method used was that described by Parish, O'Meara, and Clark (1934).

NEISSER-WECHSBERG LEUCOCIDIN (N.W.L.)

Variability of Tests for N.W.L.—It was regarded as important for the evaluation of quantitative leucocidin estimations to determine what variation in the minimal N.W.L. titre of any one toxin might occur when tested with different leucocyte-suspensions. The limits of titration of toxin, B.8750, in twelve different tests, varied from 1 in 400 to 1 in 50 (thrice 1 in 400, six times 1 in 200, twice 1 in 100, and once 1 in 50). The variation was not dependent on the test dose of the leucocyte-suspension nor on ageing of the toxin over a period of four months.

Constancy of N.W.L. Production by One Strain of Staphylococcus, Wood 46.—From the staphylococcal strain Wood 46 eight toxins, in addition to "standard" toxin, B.8750, were prepared by the routine method at different times on different batches of medium. Considerable amounts of N.W.L. were produced in all filtrates over a period of eight months, six having a minimal N.W.L. titre of 1 in 200 or more.

N.W.L. Production by Differently Pigmented Colonies.—In a few instances toxins prepared from differently pigmented variants of the same staphylococcal strain gave identical minimal N.W.L. titres—e.g., strain I., white and orange colonies, each 1 in 100; strain II., cream and orange colonies, each > 1 in 200; strain III., white and orange colonies, each nil.

Relationship of N.W.L. Production to Pathogenicity of Staphylococcal Strains.—In all 33 filtrates were prepared. None of 7 toxins from strains from non-pathological sources contained N.W.L., whereas all of 26 toxins from strains from patients undergoing hospital treatment (for furunculosis, blepharitis, carbuncle, sycosis, breast abscess, osteomyelitis, or septicæmia) gave a N.W.L. titre varying from 1 in 25 to 1 in 200 or more.

Relationship of N.W.L. to α- and β-Hæmolysin.—The relationship of N.W.L. to α- and to β-hæmolysin (Bigger, Boland, and O'Meara, 1927; Glenny and Stevens, 1935) was studied by (*a*) tests of comparative thermolability; (*b*) quantitative comparison in filtrates; and (*c*) absorption tests.

(*a*) A toxin, Z.1815, containing both α- and β-hæmolysin, which was prepared from the staphylococcal strain "Bigger albus Aα," and the control toxin, B.8750, containing α-hæmolysin only, were heated for 30 minutes at 56° C. The N.W.L. and α-hæmolysin were completely destroyed, but the β-hæmolysin titre was left unchanged. N.W.L. and β-hæmolysin are therefore not the same toxin.

Heating a toxin of α-hæmolytic type for one hour at 50°, 70°, or 100° C. completely destroyed N.W.L. and α-hæmolysin; heating the same toxin for one hour at 40° C. reduced N.W.L. and α-hæmolysin in the same proportion—in two experiments to half their original titre, and in one to a quarter.

(*b*) A comparison was made of the N.W.L. and α-hæmolytic titres of twenty-nine toxins prepared from different strains of staphylococci. In twelve of these neither N.W.L. nor α-hæmolysin was detected, and in the remaining ones the titres ran roughly

parallel—i.e., where the N.W.L. titre was high the α-hæmolysin titre was also high and vice versa. No toxin was found in which the one could be detected but not the other. β-hæmolysin was not found in any of these filtrates by direct titration.

(*c*) Absorption test using leucocyte-suspension macroscopically free from red cells showed that N.W.L. was absorbed by leucocytes, and that the α-hæmolysin was also greatly reduced in amount. The experiments were not completely satisfactory because of technical difficulties; moreover, the red cells used for the titration of hæmolysin were possibly a more sensitive indicator than leucocytes, of any toxin which remained unabsorbed.

Absorption tests have been attempted by other experimental workers, but usually with inconclusive results (see Neisser and Wechsberg, 1901; Weld and Gunther, 1931).

NEISSER-WECHSBERG ANTI-LEUCOCIDIN (ANTI-N.W.L.)

Accuracy of the Titration.—It was thought necessary for the evaluation of subsequent results to determine what variation in titre of the same sample of antitoxin might occur from test to test. For this purpose 5 antitoxins (4 from immunised horses and 1 from an uninjected rabbit) were tested on two different occasions and it was found that a difference in titre of 100 per cent. either greater or less may occur in successive tests on the same sample of antitoxin. In view of the small volume, 0·25 c.cm., in which the dilutions were made and the complicated nature of the test this discrepancy is not surprising.

Anti-N.W.L. and Anti-α-hæmolysin Titres of 66 Sera. Values in Terms of "Standard" Serum "K"

No.	Serum.	Anti-N.W.L.	Anti-α-hæmolysin.	No.	Serum.	Anti-N.W.L.	Anti-α-hæmolysin
1	Normal human.	0·005	0·003	43	'Immune' rabbit.	0·01	0·01
2		0·01	0·012	44		0·02	,,
3		,,	0·015	45–47		,,	0·015
4		0·02	0·012	48		0·08	0·076
5		0·04	0·042	49		0·25	0·171
6–7	'Immune' human.	0·02	0·015	50	Normal horse.	0·08	0·05–0·07
8–15		,,	0·022	51	'Immune' horse.	0·133	0·125
16–18		,,	0·034	52–54		0·5	0·46
19–21		,,	0·051	55–56		0·66	0·66
22–25		0·04	0·034	57		1·0	0·8
26		,,	0·051	58		,,	2·0
27		,,	0·076	59–60		1·3	1·8
28		0·08	,,	61–63		4·0	2·0
29–41	Normal rabbit.	Nil.	Nil.	64–65		10·0	3·3
42		0·02	0·022	66		,,	5·3

'Immune' signifies only that the samples were obtained after a course of immunising injections of toxin or toxoid.

Relationship of Anti-N.W.L. and Anti-α-Hæmolysin in Normal and "Immune" Sera.—A series of normal and "immune" sera from human beings and animals were tested for anti-N.W.L. and anti-α-hæmolysin, both titres being expressed in terms of "standard" antitoxin "K," which contains 150 international units of anti-α-hæmolysin per c.cm. (see Table). The majority of the antihæmolysin titres were tested independently by other workers, using the method introduced by Parish, O'Meara, and Clark (1934). (In the case of human sera, Dr. D. Stark Murray has kindly allowed me to use his figures.)

Of the 66 sera titrated for anti-N.W.L. and anti-α-hæmolysin, 13 contained neither antibody. The remaining sera in practically all cases showed agreement in titre for the two antibodies; where discrepancies arose these fell within the limits of error of the tests.

CONCLUSIONS AND SUMMARY

(1) A modification of the Neisser and Wechsberg technique for the estimation of staphylococcal (Neisser-Wechsberg) leucocidin (N.W.L.) and anti-leucocidin (anti-N.W.L.) is described, and the accuracy of the tests discussed. (2) One strain of staphylococcus, "Wood 46," produced N.W.L. of high titre consistently over a period of eight months. (3) Thirty-three filtrates were prepared from different staphylococcal strains. None of 7 toxins prepared from strains derived from non-pathological sources contained N.W.L., whereas 26 toxins prepared from strains isolated from pathological lesions yielded N.W.L. varying in titre from 1 in 25 to 1 in 200 or more. (4) N.W.L. is thermolabile at 56° C., and is largely destroyed by heating to 40° C. for one hour, being identical in this respect with α-hæmolysin and differing from β-hæmolysin which is thermostable at 56° C. (5) Of 29 toxins prepared from different strains of staphylococci, 12 contained neither N.W.L. nor α-hæmolysin. In the remaining 17 the titres ran roughly parallel—i.e., where the N.W.L. titre was high, the α-hæmolysin titre was also high and vice versa. In no toxin was the one found without the other. (6) Absorption of N.W.L. and α-hæmolysin by leucocytes gave inconclusive results. (7) Sixty-six sera from man, rabbits, and horses, normal and "immunised," had in nearly all cases corresponding titres of anti-N.W.L. and anti-α-hæmolysin, expressed in decimal fractions of "standard" antitoxin "K." In the few exceptions the titres fell within the limits of error of the tests. (8) It is suggested that N.W.L. and α-hæmolysin of staphylococcal filtrates prepared by the method referred to in this paper are identical, and that anti-N.W.L. and anti-α-hæmolysin are the same antibody.

My thanks are due to Dr. H. J. Parish and Dr. R. A. Q. O'Meara for their kind help with this work; to Mr. A. T. Glenny and Miss M. F. Stevens for supplying "immune" horse sera; and to Dr. D. Stark Murray for kindly supplying human sera and allowing me to use the results of his antihæmolysin titrations.

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BOND-STREET WARD AT THE MIDDLESEX HOSPITAL. The Bishop of Willesden, on April 23rd, dedicated the Bond-street ward at this hospital. Approximately 200 in-patients from Bond-street firms are treated every year in the hospital, and a much larger number of out-patients. Prince Arthur of Connaught said that Bond-street had its full sense of that civic pride which led centuries ago to the foundation of the great city companies with their traditions of service and charity. The ward is set aside to provide treatment for accidents and fractures.

LATE ETHER CONVULSIONS

A STUDY BASED ON FOUR CASES

By R. F. Woolmer, B.M. Oxon.

SENIOR RESIDENT ANÆSTHETIST TO ST. THOMAS'S HOSPITAL, LONDON; AND

Stephen Taylor B.Sc., M.B. Lond.

HOUSE PHYSICIAN TO THE MEDICAL UNIT AND LATE RESIDENT ANÆSTHETIST AT THE HOSPITAL

Convulsions occurring during deep ether anæsthesia were first described by Wilson, and they are now recognised as one of ether's most serious immediate dangers. Fortunately they are rare; the longest series seen and recorded by one man is Pinson's 15 cases. The mortality is about 50 per cent.; two of our four cases were fatal. Each showed the characteristic clinical picture, with minor variations, but each was treated in a different way. All occurred in the theatres of St. Thomas's Hospital during 1935, and one or other of us was present on each occasion.

TYPICAL CLINICAL PICTURE

The patient is a child or young adult with pyrexia, usually due to some acute septic condition. The theatre is overheated. Atropine has been given and the dose may have been excessive. The patient is deeply anæsthetised with ether, the pupils being dilated and inactive to light. The colour is, as a rule, good, and oxygenated ether is sometimes being given. The eyelids start to twitch, then the face, and the convulsions become general. In the immediately fatal cases, after 5–10 mins. of convulsions the respiration ceases, the patient goes blue, and the heart stops; in other cases, the convulsions stop, but the patient dies later from cardiac failure; alternatively, recovery may follow the cessation of the convulsions.

Ether convulsions have to be differentiated from ether clonus, which occurs in the early stages of anæsthesia. Clonic twitching starts in the limbs and may become very violent; it ceases as the anæsthesia deepens. True convulsions occur only after full anæsthesia has been established, and the term "late ether convulsions" is used to emphasise this difference.

DESCRIPTION OF CASES

For comparison, the essential features of our cases are given in the Table.

In Case 1 oxygenated ether was being used; the convulsions were recognised the moment they started and were easily stopped. A subsequent ether anæsthesia was given without convulsions. McDonald, Willway, and Ashworth have described similar cases.

In Case 2 a second dose of atropine was given owing to delay with the previous operation. The day temperature was excessive, and the anæsthetist actually remarked upon the possibility of convulsions before starting the anæsthetic. As the surgeon needed complete relaxation however, open ether was used. So far as we know, this is the first case of ether convulsions in which the anæsthesia has been successfully continued with ether—and moreover ether from the same bottle.

In Case 3, as in Case 1, a pyrexial patient had a large dose of atropine on a hot day. All the usual methods of stopping the convulsions failed, and this is, we think, the first time Evipan Sodium has been used. Its success in stopping the convulsions justifies its being tried in the future.

In Case 4 the day was again hot. The heart stopped, but was successfully restarted by cardiac massage, and it beat strongly as long as artificial respiration was continued. All attempts to start spontaneous respiration, however, failed and ventilation was maintained by means of the Drinker automatic respirator. This kept the patient alive for 3½ hours, before the heart finally stopped. We therefore think the automatic respirator worthy of further trial.

ÆTIOLOGY

In the past several theories as to the cause of ether convulsions have been advanced.

Impurities.—Wilson found acetaldehyde and peroxides in the ether he was using when convulsions occurred, and not in other samples of ether. Walton had a similar experience. Sykes, however, records a case where acetaldehyde was absent, and peroxides amounted to only 0·05 part per million of ether. Ross Mackenzie describes seven cases where the ether was carefully analysed. The largest amount of peroxides was 0·65 part per million, while the largest amount of acetaldehyde was 0·05 part per million; the toxic dose of each is ½ per cent., so that it is almost inconceivable that these impurities were the cause of the convulsions. Our case (No. 2), where the same ether was used after the convulsions had ceased, with no ill-effect, is strongly suggestive that ether, per se, or its impurities, is not to blame.

Idiosyncrasy.—Hadfield and Kemp have thought that some patients have an "ether convulsion diathesis." Four cases have already been mentioned where ether has been used successfully after convulsions had occurred at previous operations. Our Case 2 is even more important in discounting the suggestion of a diathesis.

Congestion of the Rolandic area from jugular obstruction is suggested by Hewer, who advises raising the chin to relieve it. In Case 2 the manœuvre of lowering the chin was tried and the convulsions immediately became worse. Rolandic congestion may therefore be of some significance.

CO_2 accumulation is believed by Pinson to be the cause. Actually CO_2 is a most effective agent in treatment.

Atropine overdosage.—Hornabrook suggested this. It occurred in two of our four cases, and is a factor frequently but by no means always present.

Sepsis.—This too is often but not invariably present. Enormous numbers of septic cases have ether anæsthesia without convulsions.

Over-oxygenation.—Mennell thought this might be the primary factor. It was present in one of our cases, but another was definitely cyanosed. Cyanosis has several times been described as a precursor of ether convulsions.

It is obvious that none of these views is at all satisfactory. We suggest that ether anæsthesia upsets the normal heat-regulating mechanism of the body and we wish to support Dickson Wright's hypothesis that *heat-stroke* may play a big part in the ætiology of ether convulsions. Our evidence is as follows: (1) In three of our four cases the day temperature was excessively high. Hadfield's cases at St. Bartholomew's Hospital, London, all occurred during the summer. (2) The association of ether convulsions with pyrexia is well known. All our cases were pyrexial, and the post-operative temperatures were high. Temperatures during the convulsions were unfortunately not taken. Mackenzie records a case where, during the convulsions, the

temperature was 108° F. Cold sponging lowered the temperature and stopped the convulsions. When the patient was back in bed the temperature rose to 106·8° F., and convulsions started again. Once more cold sponging proved successful, though the patient died later. (3) By stopping sweating, an overdose of atropine tends to reduce heat loss. Its association with ether convulsions has already been mentioned. (4) The hyperpnœa which CO_2 produces, not only removes ether but also heat from the body. It has already been shown that ether itself is probably not the cause of the convulsions. The beneficial effect of CO_2 in relieving convulsions may well be due to its action in accelerating heat loss. (5) In 11 of Pinson's 15 cases the convulsions followed the use of the ether bomb, the principle of which was to deliver superheated ether vapour into the patient. (6) Bull describes the case of an Arab woman who had convulsions under chloroform. The heat at the time was too great for the use of ether. (7) Convulsions are one of the manifestations of heat-stroke. Willcox describes the heat hyperpyrexia form of heat-stroke as follows: "The onset may be sudden, with rapid rise of temperature, coma and convulsions . . . the skin is hot and dry, and the face flushed and cyanosed . . . the pupils are dilated . . . fibrillary twitchings of the muscles and convulsions usually occur . . . and pulmonary œdema is a terminal event." This description would do very well for an ether convulsion.

FOUR CASES OF ETHER CONVULSIONS

—	CASE 1.	CASE 2.	CASE 3.	CASE 4.
Sex and age ..	Female, aged 14.	Female, aged 6.	Male, aged 39.	Female, aged 20.
Disease	Acute mastoiditis.	Acute appendicitis.	Acute appendicitis in a case of obstructive jaundice.	Acute appendicitis.
Day temp. ..	57° F.	77° F.	84° F.	69° F.
Patient's temp.—Before operation	101·5° F.	100·8° F.	103° F.	102° F.
After operation	103° F.	104·2° F. (rectal)	104° F.	—
Atropine dosage (gr.).	1/100	1/100 + 1/150	1/75	1/100
Anæsthetic ..	Clover→ open ether→ ether and oxygen by Mennell's bottle.	Ethyl chloride→ open ether.	Ethyl chloride→ open ether.	Clover→ open ether.
State under anæsthetic	Good. No cyanosis.	Flushed→ Cyanosis (O_2 given). Pulse-rate 120→150→180.	Fair. No cyanosis. Difficult gangrenous appendix removed.	—
Duration of anæsthesia before onset of convulsions (mins.)	10	12	65	50
Duration of convulsions (mins.)	3	5	25	10
Treatment of convulsions.	Ether stopped; O_2 and CO_2 given.	Ether stopped; O_2 and CO_2 given. Dropping chin forwards made convulsions worse.	Ether stopped; O_2 and CO_2 given: no effect. Chloroform: no effect. Cyanosis increasing. Trachea intubated, head raised. Colour improved, but convulsions continued. Amyl nitrite, then chloroform again. Convulsions and pulse worse. Adrenaline ℿ10 intravenously. Evipan sodium 8 c.cm. intravenously.	Ether stopped. O_2 and CO_2 given.
Result of treatment of convulsions, and details of further general treatment.	Convulsions ceased after 2 minutes' hyperpnœa.	Convulsions ceased after 4 mins.' hyperpnœa. Anæsthesia was by then quite light.	Convulsions ceased within 2 mins. of injection of evipan. Operation quickly concluded. Pulse-rate 146, quality poor, on leaving theatre.	After 10 mins.' convulsions, heart and convulsions stopped. Trachea intubated and artificial resp. with McKesson's apparatus started. Adrenaline (4 c.cm. in all) given. Cardiac massage twice restarted heart. No spontaneous resp. after initial failure. After 1½ hours' artificial resp. with the McKesson, she was transferred to Drinker respirator.
Anæsthesia during rest of operation (and duration).	Chloroform and O_2, by Junker's inhaler, for 40 mins.	Open ether, from the *same* bottle, with O_2 for 20 mins.	None needed.	None needed.
After-treatment.	Nil.	Nil.	In spite of cardiac stimulants, patient died 3¼ hours after operation without recovering consciousness.	After 3½ hours in the Drinker respirator, patient died from cardiac failure.
After-history ..	Developed streptococcal septicæmia and lateral sinus thrombosis; 13 days after first op., lateral sinus opened and jugular tied under prolonged open ether anæsthesia. No convulsions; uneventful recovery.	Rapid uneventful recovery.	P.M.: Extensive carcinoma of liver, dilatation of heart, and severe pulmonary œdema.	P.M.: Terminal dilatation right side of heart. Nothing else abnormal.

PROPHYLAXIS AND TREATMENT

In the belief that the heat-stroke hypothesis provides the best explanation which has so far been offered for the ætiology of ether convulsions, we advise appropriate means of prophylaxis and treatment.

The anæsthetist should limit pre-operative atropine to gr. 1/150 in children and young people with acute septic diseases and a temperature of over 100° F., especially in hot weather, and he should avoid excessive coverings, above all mackintoshes, for such patients in the theatre. He must be constantly on the watch for the first twitch of the eyelids or mouth in these patients, and, if it occurs, he must apply treatment immediately.

To treat the convulsions, CO_2 and oxygen should be given at once. If they do not cease within a minute, evipan sodium should be injected intravenously. While preparing the evipan, cold sponges and ice should be applied to the body and face. If necessary, the trachea should be intubated. To combat cardiac failure, adrenaline and Coramine should be given, and for respiratory failure, artificial respiration—manually, or mechanically by means of the McKesson machine and the Drinker respirator or Bragg-Paul pulsator; the latter is probably preferable, as the Drinker apparatus tends to conserve heat.

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CLINICAL AND LABORATORY NOTES

ANEURYSM OF THE SPLENIC ARTERY SIMULATING CHOLECYSTITIS

BY S. E. OSBORNE, L.M.S.S.A.

RESIDENT SURGICAL OFFICER, WORTHING HOSPITAL, SUSSEX

ANEURYSMS of the splenic artery, although uncommon, are not as rare as would at first sight be expected, and Anderson and Gray in 1929 were able to collect 58 recorded examples.[1] The present case has certain unusual features.

Miss A, aged 43, a cook, was sent to the Worthing Hospital as a case of acute cholecystitis. She gave a history that apart from pneumonia and influenza, her only illness was in 1909, 27 years previously, when an operation was performed for suspected disease of the gall-bladder. The operation scar is a paramedian supra-umbilical one: evidently the gall-bladder was inspected and found to be normal and the appendix removed through this high incision.

The present symptoms began six years ago, when the patient first complained of abdominal pain coming on in attacks at infrequent intervals, colicky in nature, beneath the right costal margin, radiating through to the right shoulder and *aggravated by stooping*. A feeling of fullness was noticed in the epigastrium, discomfort after meals, and very troublesome flatulence. There was continuous nausea but only occasional vomiting. Fatty foods were not tolerated and brought on pain. Occasionally after the attacks there was slight jaundice, but the urine was not noticed to be deeply coloured and clay-coloured stools were not a feature.

Examination.—The patient was stout, very nervous, and apprehensive. Temperature, 98·4° F.; pulse-rate, 96; respirations, 20. There was some tenderness over the gall-bladder on palpation, and slight tenderness in the epigastric region, which persisted for some time afterwards. The heart and chest were normal. No other abnormalities were to be found, and the diagnosis of gall-stones with cholecystitis was made. An opaque cholecystogram showed that the gall-bladder filled and emptied normally and no stones were demonstrated.

Operation.—Under ethyl chloride and ether anæsthesia the abdomen was opened through a midline incision and the gall-bladder inspected. Many adhesions were present, but no gall-stones were felt either in the gall-bladder or in the common bile-duct. A large whitish-grey round tumour then came into view, lying in the gastrohepatic omentum above the stomach and midway along the lesser curvature of the stomach. The tumour was firm, fluctuant, and about the size of a tangerine orange. The walls were calcareous and crackled when pressed. No pulsation was seen or felt, and the tumour was thought to be a pancreatic cyst, and was incised. Blood escaped with considerable force and the stream was seen to pulsate. The diagnosis of an aneurysm was at once obvious. By firm pressure on the aorta with the fingers it was possible to control the hæmorrhage. The position of the aneurysm was such that removal was impossible, and an attempt to sew up the incision in the aneurysm failed because the walls were so calcareous

A photograph of the spleen (S), aneurysm (A), and kidney (K) dissected post mortem.

that the stitches cut out as soon as they were inserted. The patient had by this time lost a considerable amount of blood, and as her condition was giving rise to some anxiety, the wound in the aneurysmal sac was closed by two pairs of curved artery forceps, which were left in situ. The abdominal wound was closed and the patient returned to bed.

Post-operative treatment.—The patient was given the usual restoratives and a blood transfusion of 26 oz., and on the following day her general condition had improved. On the third day the clamps were removed. On the ninth day after the operation she was taking food well and did not complain of pain or feeling unwell. There was some serous discharge from the wound. At 12.20 A.M. a sudden severe secondary hæmorrhage took place, and in spite of blood transfusions, morphia, and hæmoplastic serum the patient collapsed and died at 10.15 A.M.

Pathology.—Post-mortem examination revealed a large and flabby heart with excess of fat. The aortic valves were normal and free of vegetations. There was no

[1] Anderson, W., and Gray, J.: Brit. Jour. Surg., 1929, xvii., 267; see also Brockman, R. St. L.: Ibid., 1930, xvii., 692.

atheroma of the aorta. About a third of the way along the splenic artery from its origin at the cœliac axis was a thick-walled partly calcified aneurysm, the size of an egg and containing laminated blood-clot, firmly adherent to the pancreas and splenic vein. The artery distal of the aneurysm was very tortuous. The spleen was very large, about three times normal in weight and size (see Figure). The liver was fatty, the gall-bladder was normal and contained no stone.

The interest in this case is that the symptoms resembled those of a cholecystitis with gall-stones. In the cases previously reported the symptoms have simulated those of a gastric and duodenal ulcer very closely in the majority of cases and the reference of the pain to the gall-bladder area is unusual. It is possible that the opening of the abdomen for suspected gall-bladder trouble 27 years previously marked the commencement of the formation of the aneurysm. A point in the differential diagnosis is the alteration of the intensity of the pain with posture, suggesting rather strongly a vascular lesion. As in the other reported cases there was no history of trauma. The Wassermann reaction was negative, and there was nothing to suggest a possible cause for the formation of the aneurysm.

ACUTE APPENDICITIS IN AN INFANT RESEMBLING INTUSSUSCEPTION

By F. H. Coleman, M.B. Camb., M.R.C.P. Lond.

RESIDENT MEDICAL OFFICER, THE QUEEN'S HOSPITAL FOR CHILDREN, LONDON, E.

The following case is recorded because the patient was unusually young and because there were symptoms suggestive of intussusception :—

A girl, aged 5 months, was brought to hospital by her mother, who said that for nine hours the baby had had screaming attacks, associated with drawing-up of the legs; the attacks had lasted a few minutes, the intervals between them being spent in sleep. At the onset of the attacks the mother had noticed the passage of bright blood and mucus per rectum; this also occurred just after arrival at the hospital. The baby was bottle-fed, but had not taken anything that day; there had been one moderate-sized food vomit. A fortnight previously there had been an alleged attack of broncho-pneumonia, treated at home.

The baby appeared to be fairly well nourished and not very ill. The temperature was 100·2° F. and the pulse-rate 176. Two more or less typical screaming attacks occurred during the examination. There were numerous coarse rhonchi in the chest, and the abdominal examination was negative, save for a suggestion of emptiness in the right iliac fossa. A rectal examination revealed no blood on the examining finger, nor any tumour.

The diagnosis was believed to be intussusception, although the possibility of the case being one of Sonne dysentery troubled us considerably, especially as an epidemic of the latter was raging in the neighbourhood. After admission the screaming attacks continued and it was thought advisable to make an examination under anæsthesia. The result of this was that we could just feel a lump deep down under the right costal margin, which decided us to carry on and open the peritoneal cavity. On opening this, a certain amount of free fluid was found; no intussusception was present, but the distal third of the appendix was very acutely inflamed. Apparently the palpable lump was accounted for by the right kidney, which had prominent fœtal lobulation. The appendix was removed, and the operation was followed by very rapid and entirely uneventful recovery, the stools having a normal appearance two days after operation. A stool, passed the day after admission, was examined bacteriologically, and found to contain mucus, but no non-lactose-fermenting organisms.

This case leads one to wonder whether appendicitis is not a far commoner disease of early childhood than is usually appreciated. Simpson-Smith [1] states that in a series of 311 cases of appendicitis at the Hospital for Sick Children, Great Ormond-street, exploration of the abdomen revealed in 65 per cent. an appendix which was either gangrenous, perforated, or necrotic in an abscess cavity; and this suggests an earlier attack in at least a proportion of these.

The cases which actually have been diagnosed in infancy have often been discovered accidentally whilst operating for another condition. Thus Ham [2] reports the case of an infant 12 days old, with one day's history of swelling of the right side of the scrotum, associated with one vomit, which was found at operation to have a scrotal hernia containing the cæcum and a gangrenous appendix. Pope [3] also reports the case of a baby 3 weeks old, with five days' history of swelling and inflammation of the penis and scrotum, and a temperature of 102·2° F., diagnosed as acute orchitis and treated by incision and drainage. A sinus formed soon afterwards, and this was followed by a hernia at that site. Two years later an operation for radical cure of a right scrotal hernia was performed, and the appendix was discovered adherent to the sinus and showing evidence of old inflammation, both testes being perfectly normal. The case here reported falls into the same category, since the true nature of the disorder was not suspected.

I am much indebted to Mr. D. W. C. Northfield, under whose care this patient was admitted, for permission to place the case on record.

REFERENCES

1. Simpson-Smith, A.: Practitioner, 1935, cxxxiv., 518.
2. Ham, C. I.: Brit. Med. Jour., 1927, i., 1927.
3. Pope, S.: Ibid., 1927, ii., 307.

TWO CASES OF RETENTION OF URINE IN WOMEN

By H. P. Winsbury-White, M.B. Edin., F.R.C.S. Eng.

SURGEON TO ST. PAUL'S HOSPITAL FOR GENITO-URINARY DISEASES, LONDON

These cases are of particular interest for two reasons: one is the prominence of the chronic inflammatory element in the ætiology, and the other is the satisfactory result of resection of tissue from the bladder neck, performed by the high-frequency cutting method.

Case 1.—The first patient, a single woman aged 30, was first seen in December, 1934. She complained that she was in the habit of holding her water for two or three days, after which it was passed spontaneously. She gave the following history. After appendicectomy in 1928 a catheter had to be passed daily for nearly three weeks, but micturition became normal on her discharge from hospital. It remained thus until Christmas, 1933, when she was confined to bed for three weeks with a bruised shoulder and abdominal pain resulting from a motor-car accident, and resumed her former habit of holding her water for three days. On discharge from hospital normal micturition again returned, and it was maintained until August, 1934, when, after a cold in the head and chest, she returned to her old practice of urinary retention for two and three days at a time. This was the state of affairs when I saw her in December, 1934.

At this time the laboratory report on the urine showed it to be sterile, nor were any pus cells or any chemical abnormalities detected. The blood Wassermann reaction was negative. While interrogating the patient it was

noticed that she suffered from spasmodic twitchings of the face and one or other shoulder. She informed me that these had come on after the motor-car accident about a year before. On examining the vulva, swelling and redness were noted in connexion with the Skene's gland and there were also some small superficial ulcers surrounding the orifice of the introitus. These lesions were investigated carefully and the possibility of syphilis was thereby eliminated. A small introitus prevented a view of the cervix at this time. Cystoscopy showed œdema at the internal urinary meatus and a raising of the posterior lip of this structure above the floor of the trigone. Intravenous urograms failed to reveal any renal abnormality, and it was particularly noted that there was no evidence of back pressure on the kidneys from the distended bladder. The blood-urea was 27 mg. per 100 c.cm.

After six months' treatment with fortnightly and monthly urethral dilatations, the patient improved to the extent that she was able to empty her bladder once in 24 hours. At this stage I admitted her to hospital for examination of the pelvic organs under an anæsthetic and for treatment to the bladder neck. On bimanual vaginal examination no abnormality was detected but inspection showed erosion of the cervix. I therefore dilated and cauterised the cervix. With the McCarthy electrotome I then removed a piece of tissue from the floor of the internal urinary meatus measuring ½ by ¼ inch. Microscopical examination of the excised tissue showed a certain amount of round-celled infiltration and fibrosis of the part. The result of this treatment was that the patient passed water twice in 24 hours, but a few weeks after discharge from hospital she returned to her old habit of micturating once only in 24 hours. Twitches of the face and shoulder, however, disappeared after this treatment and have not subsequently returned.

Four months after the operation I again admitted the patient to hospital and removed another small piece of tissue from the bladder neck. Since this time, which is now about five months ago, she has passed her water regularly two and three times a day.

CASE 2.—My second patient was a married woman of 44, who had had three children, now aged 22, 17, and 10. She had had an attack of complete retention of urine three weeks previously, which had to be relieved by catheterisation. The history of this complaint goes back 22 years to the time when she had a similar attack after her first confinement, and there have been several such crises at long intervals in the intervening period. Frequency of micturition has always followed, and when I first saw her, although she was able to hold her water as long as four hours during the day, she found it necessary to rise four times during the night. Her periods have been somewhat irregular.

On examination a tendency to procidentia was evident. A ring pessary was being worn for this. The cervix appeared somewhat hypertrophied but otherwise normal. Cystoscopy showed the retrotrigonal pouch which is characteristically noted with vesicovaginal displacement. Both kidneys were functioning well as indicated by the excretion of indigo-carmine. The posterior margin of the internal urinary meatus was seen to be somewhat raised above the level of the trigone. A laboratory report on the urine indicated the presence of *Bacillus coli*.

I admitted the patient to hospital and with the McCarthy electrotome removed a single piece of tissue about ½ by ¼ inch from the floor of the internal urinary meatus. The patient was sent back to bed with an indwelling catheter for four days, during which time daily vesical irrigation was carried out. Microscopical examination of the tissue removed showed a well-marked fibrous change and round-celled infiltration, thus making it clear that chronic inflammation was the cause of the condition at the bladder neck.

When the patient was seen by me five months after her operation, cystoscopy showed a trigone which was healthy in appearance and which shelved perceptibly into the posterior urethra. There was no pus in the urine, and though coliform bacilli were still present on culture, she now stated that she had no urinary symptoms and that she no longer found it necessary to rise at night.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF PSYCHIATRY AND THE STUDY OF DISEASE IN CHILDREN

A JOINT meeting of these sections was held on April 21st at 8.30 P.M. with Dr. H. J. NORMAN in the chair.

Dr. WILLIAM MOODIE opened a discussion on

Enuresis

He said that his communication resulted from a survey by Miss Robina Addis of the London Child Guidance Clinic. All possible information from the records had been collected to combat our depressing ignorance of the subject. Enuresis was not a disease by itself, nor necessarily a symptom of mental maladjustment. It occurred in all types of child, all classes, all environments, and after all kinds of training. Many inaccurate statements were made about it, and facts and figures were needed. A comparison had been made between the non-enuretic and the enuretic children, including those not specially sent for this symptom. Enuresis was present in 314 out of 1705 children (18·4 per cent.). When the cases treated by local doctors, or merely slapped at home, were added, the extent of the problem became evident. Boys predominated, the proportion of boys to girls with enuresis being 3 to 2, whereas the proportion of boys to girls among all the children examined was 2·2 to 2. As regards intelligence the enuretics fell into two groups, high and low normals. There were less enuretics in the lower intelligence groups, and even at the idiot level only 2 out of 34 were enuretics. Enuresis did not depend on intelligence, so that attempts should be made to train imbeciles in toilet habits. The non-enuretic group increased in numbers between 10 and 14 years, whereas the enuretic reached its maximum from 8 to 10 years, decreasing with the onset of puberty. There was a definite relationship to sex difficulties, many cases clearing up when tension about sex was relieved.

A special analysis of 30 cases revealed some interesting facts. Of 19 boys, 8 and of 11 girls, 4 were cured (40 per cent.), the criterion of cure being six months without a wet bed. A change from home environment broke the vicious circle, but there was no factor of recovery common to all. A detailed study of symptoms was made as a possible guide to treatment. Results suggested that those who wetted regularly were more likely to clear up than those who wetted in bouts. The condition was attributed to "nerves," ill-health, rows at home, the East wind, or to a combination of several of these. Of 15 who showed both diurnal and nocturnal enuresis 4 cleared completely, while 5 became clean at night. A history of definite onset was obtained in 8 cases between the ages 2 and 9 years, nocturnal in 3, both nocturnal and diurnal in 5. Both types seemed equally likely to break down after control appeared

to be established. Where there was also incontinence of fæces the patient did better than was commonly anticipated, perhaps because "this can't go on" was said more firmly by parents and doctors than when enuresis alone was the trouble. In not one case was waking at night or restriction of fluids of value; these measures might do harm as a nightly reminder to the child that he was expected to wet. Habit training could be classed as good or bad; 6 recovered out of 17 good cases, and the same number out of 13 bad cases. Home conditions, birth weight, method of feeding had no demonstrable influence. The symptom appeared in the period of debility following illness, especially between the ages 2 and 3. Of 21 successful in school only 7 recovered, and cases were cured while still failing at school.

Dr. Moodie considered next the type of child in the series of 30 cases; 8 were timid, 7 withdrawn, 12 sociable, and 3 defiant, the last failing to recover. Analysis of pedigrees pointed to a high incidence of enuresis among siblings and relatives. Allergic symptoms were frequent, and possibly family trees were richer in neurotic and psychotic types. Although these figures had been worked out with great labour, they left us much where we were. In conclusion he confessed that the psychological explanation was by no means the whole story. Some physiological factor must be present also. There were chemical factors, bacillurias, fine balances between the various parts of the nervous system, anatomical anomalies not yet understood, and acting with them was the psychological factor.

Dr. REGINALD MILLER said that enuresis should be limited in this discussion to cases of urinary incontinence of functional origin. The condition either continued from infancy—"congenital" type, or arose after control had been established—"acquired" type. Males predominated and there was no enuresis problem in schools for girls as there was in schools for boys. Sometimes diurnal or fæcal incontinence coexisted. He stressed the importance of differentiating the factors that started enuresis from those that perpetuated it. The short interval between sleep and incontinence contrasted strangely with the large amount passed, which might be about three mattresses full. The automatic emptying of the bladder depended not only on the amount of urine, but on the rapidity of its accumulation. If fluid by mouth was withheld, it was attracted from the tissues, the result of some vaso-motor or secreto-motor activity. The influence of hot and cold weather emphasised the importance of rapidity of secretion. He had seen the symptom too frequently cease in summer, relapse in winter, and finally clear in the following summer, to be in any doubt on this matter, despite Dr. Moodie's disagreement. In psychological make-up bed-wetters were singularly like non-bed-wetters. Two types could be distinguished, the neurotic and the phlegmatic. The neurotic was emotional, had disturbances of conduct by day, with diurnal enuresis and perhaps fæcal incontinence; sleep was restless and disturbed, acquired enuresis was common, the proportion of girls high, and psychological disturbances maximal. In the phlegmatic type the reverse held in all particulars. There was no great difference in numbers in the two groups. The wet phlegmatic differed only from the dry phlegmatic in the regularity of his bed-wetting. Dr. Miller's contention that psychologists saw a selected group of the neurotic, emotional type was confirmed by the high proportion of females, acquired cases, and cases incontinent of fæces in their reported series. The phlegmatic type presented the real problem. Many cases could be cured by drugs, and that this was not a form of suggestion was borne out by the failure of circumcision, undoubtedly a much stronger form, and the effect of altered doses for better or worse. Belladonna and strychnine were very successful, and if all cases were associated with nervous instability there could hardly be a less suitable mixture. There was no doubt that psychologists had got away with the disorder enuresis, but Dr. Miller urged that the psychological disturbances induced by enuresis in child and parents should be distinguished from the cause of the enuresis. The anxiety state resulting from enuresis could not also be its cause. The phlegmatic boy did not care; he knew that the condition had existed from infancy, occurred when he was fast asleep, and he had the sense to know that he was not to blame. He accustomed himself to bed-wetting just as he might to being fat or red-haired or called Ramsbottom. The psychological aspects of enuresis were more epiphenomena than causal. To his mind the cause was still obscure, and he felt that the fraternal cordiality between the two sections could be re-established if they united in declaring that they did not know the cause of enuresis.

Dr. D. W. WINNICOTT claimed that psycho-analytic discoveries had made possible further understanding of enuresis, besides the treatment of individual cases. Enuresis might be normal or an early symptom of dementia præcox, but usually it was part of a difficulty in emotional development, associated with other symptoms. Frequently the symptom ceased without treatment, or after medicinal treatment, sometimes reappearing at puberty as nocturnal emissions. He discussed the possible explanations of the act from the psycho-analytic point of view. The important element was the unconscious fantasy, the principal emotions expressed being love, hate, and reparation. Anxiety was always related to the fantasy. The infant used bodily pleasures to deal with anxieties, and in order to stand pain and frustration. The mother, training the baby to be clean, could from the baby's point of view be a creator of evil, turning love into anger inside him. Early induced cleanliness might be followed by refusal to use the pot at 1 to 1½ years, a real danger of modern teaching. Control of sphincters was only stable when it resulted from the child's unconscious identification with clean and self-controlled parents. The best advice to give mothers was to avoid conscious efforts at training, merely to give the opportunity to be clean. Clean babies normally become dirty at times, and then no special effort should be made. It was wiser to leave alone the mother who did not ask for advice, acted on intuition, and might well know more than the doctor how to bring up a child. Dr. Winnicott pointed out that complete analysis always included the symptom enuresis. Absence of enuresis itself might be a symptom. The anæsthesia of the sensitive parts of the urinary apparatus was an inhibition of physical sensation secondary to repression accompanying fantasy, disappearing as this became less intense. The most difficult case showed no anxiety or depression, since all emotional difficulties were dealt with by the one symptom, instead of by phobias, obsessional behaviour, moods, and so forth. These remarks did not make treatment easier, but the subject was highly complex, and he sought to understand the forces at work behind enuresis and kindred symptoms in childhood.

Much could be got out of such tricks in treatment as hypnosis, but more from the study of causation. Although this limited the therapy to few cases, it enabled better advice to be given to the mother who wanted to know how best to bring up her child.

Dr. C. J. C. EARL said that the feeble-minded was no more liable to enuresis than was the normal child, although he was usually later in developing toilet habits. Most mentally defective children could be trained. Enuresis was commoner in institutions, in orphanages as well as in mental homes, than outside, and doctors and superintendents would all agree that epidemics occurred, often after the public execution of an offender. One or two children with enuresis could "infect" a ward previously clean. Almost all cases from 10 to 14 years were of excitable type, and he regarded enuresis as a hysterical symptom, seeing that it could be cleared up and produced by suggestion. Drug treatment was as good as any other, but perhaps it was as well that most pædiatricians gave belladonna in doses too small to have any action. He suggested that the success of any treatment that worked was due to suggestion, the highest common factor of them all. Hypnotism was valuable in high-grade mental defectives.

Dr. FRANKLIN BICKNELL had shown that as little as four ounces of water would swamp a mattress and drip through it. Where spina bifida was a causal factor, relapse was common. In an analysis of his own cases measles and whooping-cough were responsible for a large number with a late onset. There seemed to be two types of child: the flaxen-haired Teutonic type that bullied its mother and failed to clear up, and the small dark "chic" type, having frequent queer attacks of temper, that did well. An abnormally high percentage of cases had orthostatic albuminuria. As regards treatment he discounted the effects of suggestion.

Dr. C. H. ROGERSON objected to the name enuresis, implying a disease. The early English description of the young "piss-abed" suggested more accurately its symptomatic character. He agreed that it cleared up with any one of a number of treatments.

Dr. MARGARET LOWENFELD said that enuresis was merely the persistence of a characteristic normal for the first six months of life. She had been astonished at the number of children who really enjoyed bed-wetting, and said that it was nice. It had to be remembered that a child's scale of enjoyment differed from the adult's. The attitude towards bodily sensations was important. Some portrayed emotions with their bodies, some did not. She agreed that the psychologist's cases were selected from among the former, making special study possible. Boys, who predominated, all had continuous and unusually vivid fantasies. Their preponderance could be explained by the greater dramatic possibilities of the urinary function of boys compared with girls. In the type of child who lacked correlation between mind and body, sleep was so deep that the acquired control was lost.

EDINBURGH OBSTETRICAL SOCIETY

AT a meeting of this society on March 11th, with Dr. DOUGLAS MILLER, the president, in the chair, a paper on

Radium and Cancer of the Neck of the Uterus

was read by Sir COMYNS BERKELEY (London). He referred to the tragic and often unnecessary delay in making a diagnosis and instituting efficient treatment. In a group of cases he had investigated he had found that the average time from the initial symptoms till a doctor was consulted was five months, and before proper treatment was established after diagnosis another five months elapsed. The blame therefore lay partly with the patient and partly with the medical profession. As remedies for this state of affairs Sir Comyns stressed first the importance of disseminating knowledge, indicating when menstruation was to be considered normal, and advising vaginal examination if any irregularity developed. This should be done at post-natal clinics by leaflets and verbal instruction, by hanging a notice in gynæcological out-patient departments, and educating midwives to spread the information and persuade women with irregular vaginal bleeding to consult their doctors. Secondly, he said, not only was it the practitioner's duty to examine locally and investigate completely all cases of irregular vaginal hæmorrhage, but all cervical erosions should be treated thoroughly, and if they did not respond quickly, a biopsy was indicated. He fully realised the difficulties practitioners faced, especially when blamed for making an unnecessary fuss where the findings proved negative. Recently the British Empire Cancer Campaign had set up a central propaganda committee, lectures being organised for the lay public to be given by local doctors. This was at present being tried in certain districts.

Sir Comyns's cases showed that in 30 per cent. of cases of cervical carcinoma the patient was between the ages of 50 and 60, and childbearing was an important precursor, 95 per cent. of patients being married, and the average number of pregnancies being 5·4. In treatment a general anæsthetic should always be given because a more detailed examination was possible and efficient application even with a multiplicity of applicators was by no means always easy. Whether or not X rays should supplement radium treatment was still in debate. Heyman of Stockholm was not yet convinced of its benefit but found the radium bomb had a definite place in extreme cases. Theoretically, Sir Comyns felt, it was sound, and it was now being undertaken as a routine at his clinic. Before reliable statistics, which were badly needed, could be published, efficient follow-up systems, which meant much work and ingenuity, must be evolved; and the preliminary examination and grouping of cases, the treatment and the follow-up examinations should only be made by the chief and his first assistant so that the same standards were as far as possible maintained. To place a case in its proper group was often no easy matter, and in a difficult one Sir Comyns advocated "up-grading" as the proper course to follow—i.e., choose the group where there is the greater chance of recovery. A bimanual examination did not always indicate the real amount of spread—for example, to the bladder. On the other hand, parametrial masses suggesting malignant spread often turned out to be inflammatory. "Down-grading" was liable to result in this type of case being placed in too low a grade, and so statistics were falsified by improving both Stage I. and Stage IV. The only survival-rate of use for purposes of comparison between different centres was the absolute survival-rate—i.e., the calculation to be made from all cases seen whether treated or not. It would eliminate the effects of up-grading or down-grading, and was vastly superior to comparisons of the gross or net survival-rate.

REVIEWS AND NOTICES OF BOOKS

The Human Foot

By DUDLEY J. MORTON, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University. Columbia: University Press; London: Humphrey Milford, Oxford University Press. 1935. Pp. 244. 15*s*.

ANYONE who doubts whether a book on the human foot is likely to be wanted by enough readers to justify its publication has reckoned without the peculiar gifts of Dr. Morton. He has written a book on the foot, its evolution, anatomy, mechanics, and physiology, which is so good that it will undoubtedly create a demand. The first part deals lucidly with evolution, and the second with mechanics. Dr. Morton is at pains to emphasise the relation of the mechanics of the foot to the posture of the body as a whole in states of activity and in rest. From anatomical considerations alone it would appear that the foot is divided longitudinally into two parts, each with a different function: an inner part which is essentially the lever and spring, and an outer which is a base of support and a balancing organ for the lever, and takes relatively very little part in leverage action. Dr. Morton carried out, by means of an instrument of his own design called a staticometer, investigations which have a bearing upon this point. He was able to determine the amount of weight borne by each of the metatarsal heads when the foot was in action and at rest, and found that in action the line of stress came between the first and second metatarsal bone and at rest between the second and third. He therefore recognises two axes: an axis of leverage and an axis of balance. This differentiation of function is a useful conception, and gives to the outer part of the foot and even to the little toe a new significance. It helps to explain the mechanical disabilities of feet which fall even within the normal range, such as the relatively high arched and long narrow ones.

In discussing metatarsalgia Dr. Morton devotes a chapter, illustrated by good X ray photographs, to each of the three congenital conditions long associated with the name of Morton: a short first metatarsal bone, a mobile first metatarsal, and a backwardly placed sesamoid bone. He has rendered a service in once more drawing attention to these conditions, since they are probably responsible for far more cases of mechanical breakdown of the foot than is generally realised. Throughout the book he emphasises his points by ingenious diagrams, of which the one illustrating the mechanical ill-effects on the feet of a shortened tendo Achillis is a noteworthy example.

From Rousseau to Proust

By HAVELOCK ELLIS. London: Constable and Co., Ltd. 1936. Pp. 411. 12*s*. 6*d*.

IN this book Dr. Havelock Ellis writes in his usual fluent style of the literature of France. In the opening chapter he tells how, by the age of 14, he had acquired French enough to read for pleasure in that language. The first French book he read for its own sake was Rousseau's "Rêveries." It was not till 1883, many years later, that he first had occasion to visit France. In 1889 he went again with his friend Arthur Symons. Lightly and reminiscently he sketches the great literary and artistic figures with whom he came thus in contact—Coppée, Meissonier, Mallarmé, Rodin, Verlaine, Huysmans, and many more. He had the unusual experience of hearing the great Bernhardt hissed at the end of a dull play. The brilliant study of Rousseau which follows includes a chapter on that enigmatic and attractive woman Mme de Warens, whose influence on Rousseau was so profound. Subsequent essays deal with Restif de la Bretonne, "le Rousseau de ruisseau"; Besenval who, though half Polish, was the perfect type of the French chevalier; Alexandre de Tilly, the typical roué of the eighteenth century; Victor Hugo, whose "colossal superiority-complex" was his defence against the world; and, by contrast, Verlaine, who "represents genius, naked and helpless." Next come Élie Reclus, one of those men who are ranked among the criminals while they live, among the saints when they are dead; Remy de Gourmont, critic, scholar, and recluse with the Kantian capacity for visualising conditions of which he had had no personal experience; Henri de Régnier, who remained spiritually always a child; and Alain-Fournier, author of "Le Grand Meaulnes." Last comes a profoundly critical study of Marcel Proust, that erratic and contradictory figure who was a victim of nervous asthma. In the author's view Proust's work was largely conditioned and developed by this allergic state. This is not a book for the tyro nor even for the man with a mere nodding acquaintance with French literature, but those whose interest in the great and small men peopling this book is not perfunctory will appreciate the skill with which their characters are portrayed.

Diseases of the Peripheral Arteries

Diagnosis and Treatment. By SAUL S. SAMUELS, A.M., M.D., Chief of the Clinic for Peripheral Arterial Diseases, Bellevue Hospital, New York. London: Humphrey Milford, Oxford University Press. 1936. Pp. 260. 12*s*. 6*d*.

THIS book is concerned almost entirely with thrombo-angiitis obliterans and is written to advocate conservative methods of treatment for all forms of obliterative arteritis in the extremities. The author has had very considerable experience as chief of the clinic for peripheral arterial diseases at the Bellevue Hospital, and though he does not give his figures in full he states that in his series of 350 cases of obliterative arteritis treated during the past ten years only *one* required amputation. This astounding result has been achieved not so much by special methods of treatment as by Dr. Samuels' determination to persist with conservative methods when most physicians would resort to some more drastic measures to alleviate the patient's suffering. There are clinical records of case after case in which to save a leg the patient has had to endure what the author describes as excruciating agony for several weeks while gangrenous toes were separating, and has been an invalid for 6 to 12 months before healing was complete. That sound healing may be obtained by conservative treatment after gangrene has appeared is in itself a matter worthy of note, and justifies the publication of this monograph, but it is regrettable that Dr. Samuels has given no indication of the after-history of these cases. Although all agree that everything should be done to avoid amputation, it must be remembered that the disease in the arteries is progressive, and one hesitates to adopt a method of treatment which involves much pain

and prolonged invalidism without some assurance that the healed stumps after loss of the toes are unlikely to break down again when the patient returns to his usual activities. The cardinal rules of treatment are rest with the limb horizontal, hot baths (but avoidance of radiant heat), intravenous salines, and baths and wet dressings of weak chloramine for ulcers and gangrene. The author lays great stress on complete abstinence from tobacco, and states that even moderate cigarette smoking can rob the patient of the benefits derived from the most painstaking practice of all the other methods of treatment. The arguments in support of conservatism are weakened rather than strengthened by the author's repeated refusal to consider any form of surgery to improve the peripheral circulation, and he condemns every kind of operation with unnecessary vehemence. Though lacking in depth of thought and width of outlook the book deserves the consideration of practitioners interested in these vascular diseases, of which the incidence seems to increase as the years go by.

Plant Viruses

By KENNETH M. SMITH, D.Sc., Ph.D., Potato Virus Research Station, School of Agriculture, University of Cambridge. London: Methuen and Co. 1935. Pp. 107. 3*s.* 6*d.*

THOSE who wish to know something about the virus diseases of plants, but have not the time to tackle a large treatise, will find Dr. Kenneth Smith's little monograph the very thing they have been looking for. Despite its brevity it contains a clear and comprehensive outline of what is known about plant viruses. The book begins with a brief historical survey and a statement of the problem as envisaged to-day by plant pathologists, stress being laid on the great economic importance of these diseases. Following this is a chapter on the technical side of the question and here one gets a glimpse of some of the obstacles that the investigator of plant viruses has to cope with. The main portion of the book is devoted to a consideration of the behaviour of the virus in different environments, in the host, in the insect vector, in vitro, and of the way in which these virus diseases are spread. A chapter on immunity follows and the book closes with a brief comparison of animal and plant viruses. Considering the difficulties inherent in plant virus research it is extraordinary how much progress has been made in unravelling knots which seemed to be firmly entangled only a few years ago. In this work Dr. Kenneth Smith has taken a prominent part and his monograph may be regarded as authoritative.

Behaviour Development in Infants

A Survey of the Literature on Prenatal and Postnatal Activity, 1920–1934. By EVELYN DEWEY. Published for the Josiah Macy, Jr., Foundation by Columbia University Press. London: Humphrey Milford, Oxford University Press. 1935. Pp. 321. 17*s.* 6*d.*

ALTHOUGH this volume comes into the class of "books about books," it is much more than a summary of other publications. The author has sifted a prodigiously large number of original works, and has presented a lucid and coherent account of the theories and observations of normal child development published since 1920, when the scientific and intensive study of the subject began to be pursued on a large scale. An outline of the Behaviourist and Gestalt theories of child development is followed by an account of the various views of correlation of structure and function deduced from animal studies. The book is subsequently divided into sections dealing with the behaviour of the human fœtus, neonatal behaviour, and behaviour during infancy. Although the obvious difficulties besetting the study of the behaviour of the human or any other fœtus will probably make many of the theories here recorded appear grotesque in the light of subsequent knowledge, it will astonish most readers to find how much is actually known about the fœtus as a sentient being, and on what clear evidence postnatal behaviour must be regarded as the direct continuation of intra-uterine behaviour. This book should prove of worth not only to those working on any branch of the subject, but also to the more general reader. The Josiah Macy, Jr., Foundation, to whose suggestion and support the investigation is due, deserves congratulation for having initiated a valuable piece of research, and for having chosen the right person to pursue it successfully.

Infra-red Irradiation

By WILLIAM BEAUMONT, Honorary Physician and Medical Director, Institute of Ray Therapy; Lecturer in Electrotherapy, the Swedish Institute. With a foreword by Lord HORDER, K.C.V.O. London: H. K. Lewis and Co., Ltd. 1936. Pp. 139. 6*s.* 6*d.*

IN this small volume Dr. Beaumont gives a lucid and concise presentation of infra-red therapy, suitable for consultation both by the practitioner who wishes to acquaint himself with principles and by the nurse who carries out the treatment. Apparatus is briefly described and indications are given for routine technique. The analysis of over one thousand cases treated by the author shows that relief of pain can be expected in a considerable number of cases of rheumatoid and osteo-arthritis, fibrositis, neuritis, and neuralgia. In a smaller number some permanent improvement is recorded. The subject is approached mainly from the clinical side. The manual makes no claim to be a scientific treatise, and indeed it adds little to our scanty knowledge of the mode of action of infra-red radiations in the relief of symptoms and to the relative value of any given region of the infra-red spectrum. But it has value as a practical guide to treatment and as a record of the results obtained by an experienced and fair-minded observer.

Psychology and Practical Life

By MARY COLLINS, M.A., B.Ed., Ph.D., Lecturer in Psychology, University of Edinburgh; and JAMES DREVER, M.A., B.Sc., D.Phil., Professor of Psychology at the University. London: University of London Press. 1936. Pp. 307. 5*s.*

THIS is an elementary text-book which can also be read with interest and profit. Broadly speaking it is devoted to industrial and vocational psychology, but its introductory chapters give clear expositions of fundamental psychological processes and child development, without an understanding of which the untrained reader would not follow the application of psychology to industry and education. Those who are being educated and who ultimately find a place in the community have different capacities

of learning, and different temperaments; the authors have therefore included chapters on tests for emotion, temperament, and volition, as well as on acquisition of skill and methods of learning. Thus the ground is adequately prepared for chapters on vocational psychology, psychology of work, and advertising. Mental deficiency and crime are properly dealt with as social problems; but it is unfortunate that psychology and health have been disposed of in only twenty pages. Psychopathology and child guidance have made it clear to us that the dynamic of character formation influences life at all points; that the child's capacity to learn can be emotionally determined; that monotony can be due to individual peculiarities; and that accidents can be deliberate; and that advertisers must think of vanity, fear, prestige, and sex appeal. Surely this aspect of practical psychology deserved, even in an elementary book, some deeper and wider consideration. This omission, however noticeable to experts, does not detract to any extent from the value of the book, which is clear, informative, and fair in expression of opinion on problems not yet settled.

British Journal of Surgery

THE April issue (Vol. XXIII., No. 92) contains the following articles:—

Radiography of the Duodenal Cap, by G. R. MATHER CORDINER and G. T. CALTHROP (London). Attention is drawn to the limitations of deformity of the duodenal cap as evidence of ulceration. A description is given of the Berg technique of aimed exposure. The variations in the mucosal folds, the ulcer niche, and fixation by adhesions and by penetration of the ulcer base are described and illustrated.

Encrustation of the Bladder as a Result of Alkaline Cystitis, by H. G. LETCHER and N. M. MATHESON (London). In the case described encrustation involved almost the whole of the mucosal surface, and was visible in a radiogram. Repeated lavage with weak acetic acid solution caused rapid disappearance of the deposit and healing of the underlying ulceration.

Spontaneous Rupture of the Extensor Pollicis Longus Tendon Associated with Colles's Fracture, by THOMAS MOORE (Newcastle). In the three cases described the fracture had been treated by the unpadded plaster cast. Early use of the thumb in the presence of a damaged tendon is suggested as a possible cause.

Solitary Plasmocytoma of Long Bones, by JUDSON T. CHESTERMAN (Sheffield). The features of the case recorded were history of injury, localised pain, and pathological fracture. The relation of this tumour to other types of myeloma is discussed, together with its prognosis. Treatment by curettage and bone-graft are advised.

The Bladder Function in Spinal Injury, by KENNETH H. WATKINS (Manchester). The conclusions reached from observation and repeated tests on eight patients are that in complete transverse lesions reflex involuntary micturition is established, while in lesions of the conus and cauda equina micturition involves voluntary strain, the function of the detrusor muscle being seriously impaired.

A Case of Spinal Tumour, by T. SATAKOPAN and N. MANGESH RAO (Madras). The tumour, a cellular fibroma, lay in the arachnoid unattached to the dura and caused spastic paresis of the legs. It was successfully removed.

A Carcinoid Tumour of the Lower Ileum, by W. QUARRY WOOD (Edinburgh). Successful radical operation was performed. The potential malignancy of these tumours is discussed, and their origin traced to the Kultschinsky cells of the mucosa.

Colloid Tumour of the Urachus Invading the Bladder, by R. CAMPBELL BEGG (Wellington, N.Z.). The patient suffered from recurrent attacks of hæmaturia and frequency. Free excision was performed. The growth was found to be papilliferous with tall columnar epithelium.

Two Cases Illustrating the Latency of Large Renal Calculi and their Relation to Pregnancy, by JAMES COOK (Birkenhead). In one case a large branched stone was discovered owing to an attack of perinephritis during the puerperium; in the other, bilateral calculi threatened anuria in the early weeks of pregnancy.

Three Cases of Duodenal Diverticuli Removed by Operation, by H. N. FLETCHER and L. I. M. CASTLEDEN (Brighton). Pain, gastric flatulence, and vomiting were the most conspicuous symptoms. The justification for operation is discussed. No particular technical difficulty in removal was encountered and the results justified the treatment adopted.

Fracture of the Neck of the Femur, by R. WATSON JONES (Liverpool). A description of the technique and results of a modification of the Smith-Petersen operation. The author exposes the fracture site by a lateral incision and uses a heavier guide than usual over which the hollow nail is threaded and introduced by sight. He obtained bony union in 32 per cent. of the last 35 cases treated.

Two Cases of Cystadenoma of the Pancreas, by ROBERT M. JANES (Toronto). Operation in the first case presented great difficulty and removal was incomplete. A recurrent cyst was subsequently marsupialised.

Prostatectomy with Closure: Addenda and Some Observations, by S. HARRY HARRIS (Sydney). A new sucker-retractor is described. Some misconceptions as to technique are corrected and attention is drawn to the later method of trigonisation.

Intestinal Strangulation, by G. C. KNIGHT and DAVID SLOME, from the Research Department, Royal College of Surgeons of England. An account of experiments which go to prove that the important lethal factor is the production in the tissues of the gut of a toxic substance, which is absorbed into the circulation. Fluid loss was shown to be of very secondary significance.

Papers on rare and interesting cases are also included.

NEW INVENTIONS

A NASAL CATHETER HOLDER

THE nasal catheter is commonly employed for oxygen administration as it is often the most practicable method. The catheter is usually attached to the patient's face by adhesive tape. This method of fixation is insecure and may irritate the skin. Another method is to employ a band round the head. Such an appliance is not easily sterilisable and is not well tolerated; in patients who perspire freely it has been known to set up dermatitis of the forehead.

To obviate these disadvantages a modified spectacle frame was devised, the important features of which are: (1) it is light, durable, and does not grip the head; (2) the flexible wire supports are adjustable and ensure that the catheter is directed horizontally backwards and not upwards; (3) it can be readily sterilised.

The makers are Messrs. A. L. Hawkins and Co., Ltd., 66, New Cavendish-street, W.1.

C. ALLAN BIRCH, M.D. Liverp., M.R.C.P. Lond.

THE LANCET

LONDON: SATURDAY, MAY 2, 1936

OVERCROWDING OF HOSPITALS IN LONDON

A CERTAIN amount of prominence has recently been given to overcrowding in the hospitals of the London County Council and especially to the shortage of beds for the chronic sick. In taking over institutions of a great variety in type from a number of independent poor-law authorities, the L.C.C. was faced in 1930 with a complex problem. In addition to 31 hospitals proper, 12 of the 26 mixed institutions were handed over forthwith to the management of the central public health committee, as a provisional arrangement. In October, 1934, however, a new scheme of classification of patients was adopted and a reconstitution of institutions carried out to overcome the administrative confusion of having 4700 public assistance cases under the management of the hospitals and medical services committee and 1600 of their cases in public assistance institutions. It was recognised [1] that the reshuffle would be a difficult and necessarily gradual process, and entail substantial and costly improvements in some of the existing buildings. Until the final effect of these changes become demonstrable it seems wise on the part of the L.C.C. to have deferred its programme for new hospital provision. As Prof. R. M. F. PICKEN pointed out in a recent discussion at a sessional meeting of the Royal Sanitary Institute at Swansea, many questions in relation to hospitals have to be taken into consideration, such as the future numbers and location of the population, the most suitable size of hospitals, the advantages and disadvantages of specialisation, the prospect of extension of voluntary hospitals, and the readiness of the managers of the latter to pool their beds with the rate-aided. The voluntary hospitals, he said, should recognise that the staffs of council hospitals —which are training schools for nurses and may even be attached to medical schools—will not readily agree to the relegation to them of nothing but the chronic, hopeless, and uninteresting types of disease. On the other hand the council hospitals might, he thought, devote special attention to disabling but not emergency conditions which affect so many patients on voluntary hospital waiting-lists—the hernias, hydroceles, varicoceles, hæmorrhoids, and gynæcological troubles. This would be truly in line with the preventive traditions of local authorities, since it would reduce disability and prolong the productive period of life.

In the meantime, the net effect of the L.C.C.'s efforts appears to have been a reduction in the nominal number of beds available for the sick, while the demand for admission has increased. In 1931 the number of poor-law institutions in London affording accommodation for the sick was 25, with 8890 sick beds, but these figures had fallen to 21 and 6882 in 1934 [2]; general hospitals, so-called (they include children's hospitals, convalescent homes, and institutions for epileptics and venereal diseases), had increased from 35 to 40, and the contained beds from 20,141 to 21,210. Altogether, therefore, there has been a loss of nearly 1000 beds which, whether appropriately or not, had been at one time regarded as accommodation for the sick. In the same period the total number of admissions rose from 179,024 to 188,513, an increase of more than 9000 patients. It may justifiably be assumed that, if overcrowding has arisen during this period of adjustment, the patients are otherwise receiving far better medical and nursing care than those who were formerly admitted to the more ample accommodation which was ostensibly reserved for the sick. In the long view there is a strong case for hurrying slowly in this matter of hospital provision. Apart from questions as to the suitability of many former poor-law hospitals and institutions and the imperfect coördination so far established with the voluntary system, the whole complexion of the problem may change rapidly. In London some 1200 to 1300 beds may be occupied at any one time by cases of diphtheria and about 2000 by scarlet fever. If London can follow the American example and institute such a successful scheme of immunisation as Dr. GRAHAM FORBES has worked for over so many years; and if the public can be converted to a less intensive hospitalisation of scarlet fever, so long as it retains its present mild form, accommodation might become available which would be adequate for many forms of acute medical disease now admitted to general hospitals. The population, too, is ageing, a fact which may involve a proportionate increase of chronic illness, with a corresponding change in the type of provision needed. Moreover, as the last two censuses have shown, there is an outward drift of population from the area which the L.C.C. administers, thus creating new and very acute hospital problems for the home counties. If it continues London's difficulties may become less acute.

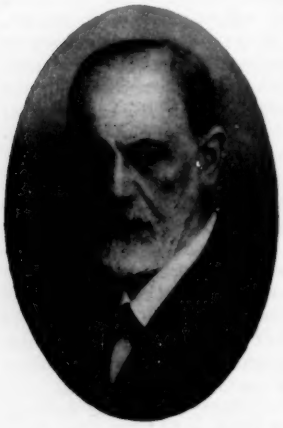
[1] THE LANCET, 1934, ii., 1187.

[2] Sixteenth Annual Report of the Ministry of Health, 1934-35, p. 98.

AN EIGHTIETH BIRTHDAY

ON the sixth of May eighty years ago, at Freiberg in what is now Czechoslovakia, SIGMUND FREUD was born, the son of Jewish parents. Over forty years ago he began in Vienna the publication of observations and theories that have made his name known throughout the world and will, in the estimation of many people, give it a place in

the history of the development of human knowledge. FREUD describes in his autobiography[1] how interest led him to the study of organic diseases of the nervous system and how he came to realise the failure of therapeutics when faced with the crowds of neurotic patients who, as he says, hurried, with their troubles unsolved, from one physician to another. It was with the aim of studying these conditions that he visited CHARCOT in 1886, and it is noteworthy that his accounts of hysteria in men and of the production of hysterical paralyses by suggestion were derided on his return to Vienna. Further visits to BERNHEIM and LIÉBAULT at Nancy were followed by the development of the method of abreaction of hidden memories under hypnosis as a means of treatment, and the publication, with BREUER, of "Studien über Hysterie" in 1895. This was the end of the pre-analytic era, for FREUD, still dissatisfied with his results, patiently worked out the technique of free association which still remains the essential weapon of psycho-analysis. The existence of an unconscious part of the mind, which had for ages been a speculation of poets and philosophers, now emerged as the key not only to psychoneurotic symptoms but to a great part of human activity. Moreover, its contents were no longer a matter of speculation but of investigation.



Psycho-analysis has now found recognition in all spheres of life where human thought and behaviour are in question, and has so far permeated medicine that even those who still count themselves its opponents have often accepted many of its teachings whilst apparently remaining ignorant of their origin. A curious charge against it at one time was that it dethroned reason, whereas, by its recognition of unconscious emotional forces, it strengthens enormously the function of reason as a guide. In this quality we may see the cause, besides anti-semitism, of its suppression in the totalitarian States of Europe, where publication of books on psycho-analysis is prohibited. The opposition that met psycho-analysis nevertheless calls for examination. FREUD'S teachings involved a fundamental change of outlook, for they concern unconscious motives of behaviour, the recognition of which runs counter to our philosophy and our pride, and to this rather than his insistence upon the importance of sex must be attributed the opposition encountered. This opposition, and the isolation that was forced upon him for years, undoubtedly influenced FREUD'S attitude to the scientific world. He made no concessions and never attempted to bring his findings into relation with the general body of psychological theory. Confirmation has come chiefly from the medical side and there is now an attitude very different from that which once found expression in uncompromising hostility. Yet discussion has played little part in this change. FREUD rarely made a direct answer to his critics, nor have his followers in this country often troubled to defend their beliefs. Useful criticism has, indeed, been lacking, for knowledge of the observations upon which the theory is based can only be obtained by making those observations oneself, and most criticism has consisted of a denial of the observations. Hence psycho-analytical doctrine has grown up without that healthy criticism which is both a stimulus and a check to scientific theory. Yet FREUD has always shown himself capable of revising, correcting, or even casting aside his own views, and his writings, when not admittedly speculative, are marked by a realisation of the difficulty the man of ordinary training and beliefs has in understanding views that concern a sphere hitherto separated from his conscious experience.

FREUD has been acclaimed as another DARWIN, and there are resemblances between the opposition he has met and that met by the pioneer of modern theories of evolution. He certainly had as hard a road to travel. DARWIN wounded man's anthropocentric pride; FREUD struck deeper and shook his egocentric beliefs. We are now recovering from the shock and realise that we have lived through another of those controversies that, as much as the discoveries arousing them, form landmarks in the history of science.

[1] An Autobiographical Study. By Sigmund Freud, M.D., LL.D. Authorised translation by James Strachey. London: Hogarth Press. 1935. 6s. The photograph here reproduced is taken from the Galerie hervorragender Aerzte und Naturforscher, issued in supplement to the Münchener medizinische Wochenschrift (1930).

THE NEW GRADES OF MILK

THE grading of milk was introduced in this country in 1923. Its object was to reward producers who took the trouble to abide by certain rules and attain certain standards: they were given a right to call their milk by certain statutory names, which would, it was hoped, give them a commercial return for their pains. Alas, the public was slow to respond, and its apathy was strengthened by inability to understand what the various designations really signified. The passage of 13 years has not completely removed the difficulty of distinguishing between the status of Certified, Grade A (tuberculin-tested), Grade A, pasteurised, and Grade A (pasteurised) milk, and it has long been evident that the original regulations considered the producer too much and the consumer too little. The same may be said of the new Order, issued last Saturday and due to come into force on June 1st, which is summarised on p. 1036.

Whenever of late years the Ministry of Health or the Board of Agriculture has been pressed to deal with the scandal of the existing milk-supply

the reply has been that the Government had set up a special committee of inquiry, and that action must wait on its report. This body, the Committee on Cattle Diseases, with Sir GOWLAND HOPKINS as its chairman, sat for nearly two years and studied the milk problem as it has never been studied before. Their conclusions, published in May, 1934, included definite proposals for regulating the whole milk-supply on scientific lines. They recommended, along with important measures for the control of bovine tuberculosis, that *all* milk for consumption in liquid form should be sold under official designation—either as certified milk, pasteurised milk, sterilised milk, or milk (uncertified). Even the last group, which was milk neither pasteurised nor from tuberculin-tested cows, had to reach a certain hygienic standard, and it is noteworthy that it was to be given a name that indicated its unreliable nature. After two years, during which no Government department has acted on these proposals, we have the new Milk Designations Order; and presumably it is all we shall get for a long time to come. This Order, it should be understood, has a very small scope and objective. Not only does it preserve the system by which the main bulk of the milk-supply escapes grading altogether—because the production of designated milk is purely voluntary—but it continues to give official blessing under the new name of "accredited" to the present "Grade A" milk. The accredited producers roll is a scheme by which the Minister of Agriculture is very properly trying to raise the general standard, and "accredited milk," since it comes only from farms where his higher standard is enforced, should be preferable to the undesignated milk which now constitutes the bulk of the market. Nevertheless it does not deserve confidence. The quarterly veterinary examination of the cows, on which so much depends, is less of a safeguard than it may seem, for it notoriously fails to detect tuberculosis and is of limited value in preventing infection of the milk-supply with the tubercle bacillus. Since, in short, accredited milk is no better controlled than Grade A, it is essentially untrustworthy, and its distribution under a special name can only lead the consumer to a false sense of security. The present Order is in this respect worse than the original draft issued last summer: in suggesting the word "standard" in place of "Grade A," this made the important reservation that the term was not to serve as a label on milk as sold to the public, and was only to be used in the internal administration of the accredited milk scheme. Is it even now too late to revert to this unobjectionable procedure and avoid the retrogressive step of including "accredited" as a designation approved by the Ministry of Health? The medical profession will remain dissatisfied—and rightly—until arrangements are made to secure a clean and safe milk-supply for the whole community. But failing that, it seems inappropriate that the Health Ministry should give countenance to a type of produce which must often be dangerous.

Under the new Order, or any other for a long time to come, the public will find its safety chiefly in efficient pasteurisation. That pasteurising is often inefficient is only too clear, and it is a minor but still serious ground for criticism of the new regulations that they put the inspection and supervision of pasteurisation in the hands of the local sanitary authorities who grant the licences. As we have urged before, this is highly technical work, and comparatively few of the officers of the smaller local authorities possess the knowledge required for it, whereas it could suitably and profitably be undertaken by fully trained officers of county councils and county boroughs. "The Minister is," we are told, "pleased to learn that a test for pasteurised milk (the phosphatase test) has recently been devised"; and those who have followed the work of its authors, Prof. H. D. KAY and Mr. F. K. NEAVE[1] will share his satisfaction in a most promising piece of work. But for the present we should only accept it as an adjuvant to skilful and experienced inspection.

REHABILITATION AFTER INJURY

An Inter-departmental Committee has been appointed by the Home Secretary, the Minister of Health, and the Secretary of State for Scotland to inquire into the arrangements in this country for restoration of the working capacity of persons injured by accidents, and to report what improvements are desirable. The decision to appoint this committee has been taken after consideration of the report issued by the British Medical Association last year, in which suggestions were made for improving the organisation of fracture treatment, and in which attention was drawn to its industrial importance. The chairman is Sir Malcolm Delevingne, formerly deputy permanent under-secretary at the Home Office, and the medical members are Dr. Muriel Bywaters, Mr. W. A. Cochrane, Dr. Thomas Ferguson, Prof. E. W. Hey Groves, Mr. H. S. Souttar, and Mr. A. C. T. Woodward.

IT is announced that the General Education Board, founded by Mr. John D. Rockefeller, has given three million dollars to the Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, to enable it to build a new hospital adjoining the Rockefeller Institute. There will be 200 beds.

THE award of the gold medal of the British Medical Association to Dr. H. Guy Dain will give general satisfaction. Dr. Dain has just retired from the chairmanship of the Insurance Acts Committee which, as everyone should know, and does not, is the executive of the annual panel conference. Both in the conference and the committee he has done much to obtain for medical men employed under the Insurance Acts the conditions they need to make their work satisfying and efficient. Coming as he does from a city where the standard of public service is conspicuously high, he has given skill and devotion to the causes he has at heart; and he has won friendly respect on all sides.

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[1] THE LANCET, 1935, i., 1516.

ANNOTATIONS

SPECIFIC CONTROL OF MEASLES

In a recent address to the Hunterian Society on the control of measles Dr. J. A. H. Brincker emphasised [1] the fact that the older methods have failed and expressed the opinion that with the adoption of passive immunisation by means of human immune serum or placental extract we have entered on a promising stage of the battle against the disease. It has been the practice of the county medical officer to issue reports upon successive measles epidemics in London, and the most recent of the series which deals with the 1933–34 epidemic has just been published.[2] As in its predecessors, special attention has been paid to the results of the use of immune measles sera in the control of outbreaks of the disease in L.C.C. hospitals, institutions, and residential schools, and Dr. Wm. Gunn, in conjunction with Mr. W. T. Russell, F.S.S., is again responsible for a statistical study. As our readers are aware, the pooled serum, suitably collected, tested, and prepared, of convalescent measles patients or of adults (preferably young adults who have had an attack of measles not more than ten years previously) may be used either temporarily to prevent or to attenuate, with resultant active immunity, the expected attack of the disease in exposed susceptible children. For obvious reasons convalescent serum is difficult to obtain, but the collection of adult serum in considerable quantity presents no insuperable obstacles if collection is organised. It is the general experience, however, that since the protective value of individual samples of adult serum is lower than that of recent convalescent serum, and that wider variations in value occur, it has to be injected in larger doses and that some batches—due in part, perhaps, to the average attack-bleeding interval being too long—are of relatively low value.

Gunn and Russell base their present statistical study on data derived from 1874 individuals inoculated with either convalescent or adult serum. To confer complete protection a minimum dose of 5 c.cm. of convalescent serum or 10 c.cm. of adult serum was injected into children under 3 years of age within six days of exposure. For attenuation these doses were employed on or after the sixth day; or, alternatively, half these standard doses earlier than the sixth day after exposure. The doses of serum given to older children were graduated according to age. Among the conclusions reached from an analysis of the data is that adult serum prevented the attack in 78·2 per cent. of the instances in which this was desired—compared with 77·9 per cent. in the 1931–32 epidemic. Since in that epidemic experience was held to show that, under institutional conditions, 25 per cent. of exposed children escape attack whether injected or not, the conclusion is reached that injection secures that three times as many children escape attack as would have escaped if no serum had been given. For some reason convalescent serum produced results inferior to those obtained in the preceding epidemic: attenuation 80 per cent. as compared with 87·8 per cent.; prevention 38·5 per cent. against 40·2 per cent. Further, the superiority of convalescent serum over adult serum is not confirmed by the present study—a surprising finding for which, it is said, no ready explanation has been forthcoming. These observers emphasise that, for attenuation, one-half the standard dose within six days of exposure is preferable to the full dose at a later period. They consider that a flat dose of 10 c.cm. of adult serum is as effective as an age-adjusted dose and that whereas this dose is perhaps too large for attenuation it is more effective for prevention than one of 5 c.cm. It is stated that the protection rates were significantly higher during March to May than in the previous quarter, and at any time were highest among children suffering from diphtheria and lowest among those suffering from scarlet fever and whooping-cough. To account for the high protection rate among diphtheria patients it may be surmised that other factors were operative, such as specially prompt removal of the infecting child.

Direct comparison of the clinical attacks of measles among the inoculated and the controls showed a significant advantage to the former in respect of initial manifestations, severity of main features, complications, and fatality-rates. The apparent equality of adult and convalescent serum must be regarded, even for attenuation, as a singular finding; a partial explanation may be found in the short attack-bleeding interval, the donors being chiefly young women, since, although the number of observations was too small for a decisive test, adult serum with an interval under ten years returned a protection rate of 100 per cent. Experience hitherto has been that although for attenuation there may be little to choose, for prevention convalescent serum is the more reliable. However this may be, it appears probable, as Dr. A. Joe pointed out in our last issue (p. 972), that in placental extract we are likely to be provided with a "reagent . . . less potent perhaps than convalescent serum, but at least equal to adult serum" and, as he says, in view of the difficulty of maintaining an adequate supply of either, its importance can hardly be over-estimated. Although Dr. Joe appears to have had little trouble with reactions following the injection of the products he employed, this is not the universal experience.[3] The earlier American preparations were by no means free from this defect which was believed to be due in part to the presence of tissue proteins. When it has been demonstrated upon a large scale that placental extract is at least as potent as adult serum—which, after all, might reasonably be expected to be the case—and that its injection causes nothing beyond trivial reactions, the control of measles, if the public permits, is in sight. The provision of a supply clearly presents no difficulties. That does not, of course, mean that measles can be prevented.

FOREIGN BODIES IN THE ŒSOPHAGUS

Foreign bodies stuck in the œsophagus are rightly recognised by patients as surgical emergencies. Unfortunately some of the common œsophageal foreign bodies, such as chicken and fish bones, buttons and boluses of food are relatively non-opaque to X rays. Wendell G. Scott and Sherwood Moore[4] have evolved a routine technique for demonstrating such non-opaque bodies. The method is, briefly, as follows. Antero-posterior and lateral "scout" films of the neck are first taken. If these are negative, the patient is observed by the fluoroscope whilst swallowing a thick barium mixture and any abnormality is noted. Thirdly, antero-posterior and

[1] THE LANCET, Jan. 11th, p. 103.
[2] London: P. S. King. No. 3180. 1s.
[3] THE LANCET, 1935, ii., 728.
[4] Jour. Amer. Med. Assoc., March 14th, 1936, p. 906.

oblique radiograms are taken while the patient is rapidly swallowing a thin solution of barium sulphate. The presence of a constant filling defect and a persistent mass of barium in the lumen is regarded as sufficient evidence on which to diagnose a non-opaque foreign body. Rapid exposures and technically perfect films are necessary. The authors consider that œsophagoscopy should be done as soon as the X ray diagnosis is made, since foreign bodies are apt to shift. Even though radiographic evidence is negative, they think œsophagoscopy is warranted if the patient's symptoms point to foreign body, and that the public should be warned against attempting to shift sharp foreign bodies by swallowing large boluses of food, a procedure which may cause perforation of the œsophagus. Films and fluoroscopic studies should include the nasopharynx and stomach.

THE DEVELOPMENT OF A GENERAL HOSPITAL

SOME 15 years ago Dr. C. J. Macalister wrote a short history of the Royal Southern Hospital, Liverpool, in connexion with the jubilee commemoration fund of new buildings. This work is now out of print and the purpose of a new edition is to provide a more inclusive record of the hospital and of those who have worked for it.[1] The result is an interesting history of a first-class institution and a pertinent commentary on the development of medicine and surgery through all but a hundred years, for the jubilee commemoration, alluded to above, had reference to the existing buildings which were opened in 1872 and not to the original foundation of the hospital whose inception dates from 1838. Consequently Dr. Macalister had vast developments in medical treatment to tell of as implied by the foundation of all the special departments in the Royal Southern, which to-day find their natural centre in a large general hospital. Among these accounts of special work none is more interesting than the rise of the Liverpool School of Tropical Medicine which is described with a detail justified by its seniority, for the Liverpool School of Tropical Medicine preceded the London School in the commencement of its activities by several months. Both schools had their origin in the decision by Joseph Chamberlain, in 1898, to advocate that medical officers selected for appointments in the tropics should have previous and special knowledge of the diseases with which they might have to deal, an opinion to which immediate effect was given by the General Medical Council in recommendations which were reflected in the medical curriculum. The foundation of the Liverpool school will always be associated with the name of William Carter, who had previously called attention to the large number of cases of tropical diseases which from the early days of the Royal Southern had been brought to the wards. Dr. Carter secured the immediate support of Sir Alfred Jones, the well-known shipowner, for the establishment of a tropical school, and in 1899 a laboratory in connexion with the new department was opened by Lord Lister, when the wards allocated for the tropical cases held occupants who represented many nationalities and had contracted their diseases in all parts of the world. The foundation of the fifteen other special departments is noted, and the clinicians associated are enumerated with an appropriate estimate of their work. A picture of successful administration of a great charity is formed out of chapters upon the clinical teaching, the nursing and almoner's services, and an able study of the social welfare of patients belonging to different types and grades.

A second section of the book sets out brief biographies in order of appointment of past members of the medical and surgical staffs. Among these biographies we find the names of William Carter, Robert Jones, Mr. G. P. Newbolt, Dr. William Alexander, Ronald Ross, the first lecturer in the tropical school, Noel Chavasse, athlete and military hero, and, to end at the beginning, J. L. Minshull, the accredited originator of the hospital who started the school for the blind in Liverpool and remained consulting surgeon to the Royal Southern Hospital until he died at the age of 82.

Dr. Macalister is to be congratulated on a sound contribution to a chapter in medical history where he himself played a prominent part, having been for many years physician to the hospital, member of the board of management, and chairman of the nursing committee.

[1] The Origin and History of the Liverpool Royal Southern Hospital. By Charles J. Macalister, M.D. Edin., F.R.C.P.Lond., Honorary Consulting Physician to the Hospital. Liverpool: W. B. Jones and Co., Ltd. 1936. Pp. 214.

PROPHYLAXIS OF WHOOPING-COUGH

IT is doubtful whether vaccines have any value in the treatment of whooping-cough, but evidence in favour of their preventive use is steadily accumulating. Dr. A. D. Gardner, in a lucid account of the prophylaxis, treatment, and bacteriology of pertussis, given before the epidemiological section of the Royal Society of Medicine on April 24th, critically reviewed our present knowledge of the subject, to which he himself has made substantial contributions. The use of a vaccine made from *Hæmophilus pertussis* (bacillus of Bordet) usually implies acceptance of the view that it is the sole ætiological agent. Dr. Gardner considers this established by the constant presence of the organism in the early stages of the disease, its absence from healthy persons and those suffering from other illnesses, and its ability to produce experimentally a spasmodic cough in apes and man. An increasing number of workers are accepting this view.

In the preparation of vaccines, it is important to select cultures in the right phase, and those prepared from rough colonies of *H. pertussis* are useless. If, however, the organism is grown on human blood medium, and fresh colonies in the smooth phase are selected, a vaccine is produced whose antigenic power is demonstrable. The more objective evidence of the efficacy of such a vaccine is its ability to stimulate the production of complement-fixing antibodies, which are known to appear in the blood when immunity is acquired by infection, overt or latent. Unfortunately we have no simple test of immunity for clinical use, and it is impossible to determine whether inoculations have conferred protection against the disease. The cutaneous test is unsatisfactory: some claim it to be an immunity index comparable with the Schick and Dick tests; others regard it as a test of hypersensitiveness analogous to the tuberculin tests. The latter seems the more probable explanation. The difficulties of interpreting tests of hypersensitiveness in tuberculosis in terms of immunity need no emphasis, and it is probable that similar difficulties will be encountered with the cutaneous test in whooping-cough. There remains the evidence obtained from a comparison of the frequency and severity of attacks in the inoculated and uninoculated. The difficulty of obtaining properly controlled results in such circumstances is familiar to every worker in the field of artificial immunisation who knows

something of the mode of transmission of infectious diseases and the laws of chance. Nevertheless, very suggestive, and sometimes remarkably successful, results have been recorded which justify the prophecy that large-scale protection against whooping-cough is in sight. Even if complete protection is not obtained, attenuation of the disease should be possible; and robbed of its serious complications by attenuation, whooping-cough, like attenuated measles, will cease to exact its present heavy toll of child life.

If active immunisation by vaccines is not yet beyond question, passive immunisation by convalescent or adult immune sera is still less firmly established; but here again there is reason to hope for better success.

THE TAKING OF SNUFF

THREE hundred pounds of snuff were issued to the 14 mental hospitals of the London County Council in 1934, as compared with 425 lb. issued to 11 hospitals in 1911. This information was given by Sir Robert Armstrong-Jones to Dr. J. D. Rolleston and handed on by him to the Society for the Study of Inebriety and Drug Addiction, when it met on April 21st. But outside mental hospitals the demand for snuff has, it seems, increased threefold during the last five years as the result of a statement in the *Times* by Sir Buckston Browne that the risk of a cold in the head was greatly reduced by taking snuff, its effect being attributed to a stimulation of the nasal mucous membrane, relief of congestion, and a free flow of mucus which washed away the peccant matter. The history of snuff-taking, Dr. Rolleston said, had received more attention from the antiquarian than from the physician. On its first introduction into Europe, in the middle of the sixteenth century, by Jean Nicot, the French ambassador at Lisbon, snuff was used as a medicine, being employed especially in the treatment of migraine, headaches, and colds in the head. It soon however became a luxury, and snuff was taken generally throughout Spain, Italy, and France during the early part of the seventeenth century. In Italy and Spain the clergy became so addicted to it, even during mass, that a papal bull forbidding snuff-taking in churches was issued by Urban VIII. in 1642 and again by Innocent X. in 1650. Snuff was introduced into England at the Restoration by the courtiers and officers who had attended Charles II. in France, and its popularity increased after the Great Plague. Henceforward, until about the middle of the eighteenth century, the snuff-box played an important rôle in the social life of the time; medical works and belles lettres were equally extravagant in praise and denunciation of the new habit. As late as 1870 Dr. J. C. Murray of Newcastle-on-Tyne was recommending its use for the relief of bronchitis and consumption; he stated his belief, in common with others at that period, that snuff was instrumental in preventing scarlet fever, measles, small-pox, pertussis, dysentery, cholera, diphtheria, rheumatism, erysipelas, influenza, and malaria. Other authorities, such as Sir Benjamin Ward Richardson, ascribed to its use various ill-effects, including impairment of the sense of smell, dyspepsia, nausea, loss of strength and appetite, formation of polypi, lead poisoning, and tremor of the hands. After the middle of the nineteenth century smoking rapidly replaced snuff-taking. Up to 1830 the sale of tobacco and cigars was insignificant compared with that of snuff; in 1850 they began to lead. The sanitary commission of 1853 found that snuff was often adulterated with things injurious to health, such as oxide of iron, chromate and oxide of lead, bichromate of potash, along with considerable quantities of silica and orris root. If snuff was taken pure its effects were, in the commission's view, mainly local. In recent years there has been little or no medical pronouncement on snuff-taking. The chief morbid change due to the habit appears to be a rhinitis, described in 1913 by O. Seifert, which consists in a chronic hyperplasia of the inferior turbinate on one or both sides. Dr. Rolleston said he had been unable to discover how far snuff-taking might become an addiction. An inquiry might be made in printing houses where the habit seems to be fairly general.

HEARING AIDS FOR THE TEACHING OF DEAF CHILDREN

OF recent years a close study of the factors that influence the audibility of spoken words has led to much improvement in the education of the deaf child. In the April issue of the *Journal of Laryngology and Otology* I. R. and A. W. G. Ewing describe the work done in the department of education of the deaf in the University of Manchester, and those concerned with the problem should not fail to read their paper in the original. It is found, they say, that even a moderately loud conversational type of utterance tends to fall short of complete intelligibility in the technical sense; some of the consonants, especially TH, F, V, and Z, are often heard imperfectly, and, though they appear to be audible, are really filled in by the listener. With normal hearing, moderately loud speech at an intensity of 60 decibels above the average threshold of audibility is intelligible to the extent of 95 per cent., while with very loud speech at an intensity of 70 decibels above the threshold vowels and consonants were perceived with approximately 100 per cent. of accuracy; but there was an increasing loss of distinctness when the intensity of the sound was raised further than this. Quantitative tests of hearing have been made on some 700 deaf children, with normal subjects as controls, by means of prepared lists of words transmitted at fixed levels of intensity through a high-quality amplifier in a sound-proof room. Children who have some residual hearing power—and they are very many—are taught to combine lip-reading and hearing to the fullest possible extent by means of suitable hearing-aid apparatus. But it is essential that the apparatus should be capable of high-quality reproduction, for any distortion is usually reflected in the children's own speech. The apparatus used contains four-stage valve amplifiers, and is not portable, since it has not been found possible to meet the requirements with the small portable hearing aids of wearable type. Three-quarters of the patients tested were severely deaf pupils from the Royal Schools for the Deaf, Manchester, or private patients. The remaining quarter were sent by school medical officers and other doctors. The latter can be divided into three groups: (*a*) The first comprised partially deaf pupils attending an elementary or private school who were reported as not making satisfactory progress, but whose speech and comprehension of speech appeared to be normal; in every case the degree of deafness shown accounted for the general backwardness. (*b*) Thirteen patients sent from schools for the backward or mentally defective were also tested, and in eleven of these there proved to be deafness to a degree sufficient to account for the retardation in speech, comprehension of speech and school subjects. It would seem very necessary that the hearing of all apparently mentally defective

children should be carefully examined. (c) Young children not yet attending any school. For these a series of tests with toys and objects has been devised, in which the young child learns in play to respond to certain sounds. In developing the hearing of children who are not completely deaf, an efficient hearing-aid apparatus is usually of immense help, but it is necessary that it should be used by teachers trained in the technique required for this specialised work. These methods usually bring about what can only be described as an extraordinary awakening of the mind, and Mr. and Mrs. Ewing report cases which show how shy and miserable children become cheerful and interested in school subjects. They are certainly justified in claiming that progress in learning to talk, and on every side, is more rapid and normal than it is when only the older means of teaching through sight and touch are used.

THE DEATH OF A GRAMMARIAN

ALTHOUGH he was in his eightieth year the sudden death of Prof. Karl Pearson will come as a painful surprise to those who, in spite of arithmetical evidence, could not think of "K. P." as an old man or detect in his latest writings any sign of faltering. Championships are well enough in chess or boxing; they have no place in science or literature. It is idle—as K. P. himself would have said—to discuss whether this or that investigator was the greatest of his time. But it is safe to say that no English man of science of the last fifty years has more profoundly influenced the thought of his time. Most educated men and women over fifty will recall their first reading of the "Grammar of Science" as an event in their intellectual development, and to all who have had even the slightest contact with statistical science the name of Karl Pearson is a household word. Karl Pearson was indeed one of the last of the giants. It is probable that in any one of the fields of his activity, pure mathematics, mathematical statistics, philosophy, history, anthropology, eugenics, he has had contemporaries of equal or greater ability; it is certain that no individual has come nearer to the ideal of universal competence. There have been other men with the gift of inspiring enthusiasm in young workers, but none better endowed than Karl Pearson. And when one recalls that, as Johnson would have said, some anfractuosities of temper led "K. P." to reprove what he thought to be backslidings of his pupils with extreme severity, the fact that nobody who has ever worked with him will hear of his death without a painful emotion of bereavement is a proof of his unique power. When, nearly forty years ago, Karl Pearson opened the biometric campaign, statistical methods were almost unknown in the medical profession. There had been one or two great men in official service, such as William Farr and Shirley Murphy, who realised the power of the statistical method. The great Louis long before had perceived the importance of a numerical method to the clinician and William Osler had done something to popularise statistical tabulations. But the methods used were primitive and Pearson found little sympathy among brother mathematicians with his zeal to make mathematical methods available to those who had not been mathematically trained. He found even less readiness among members of our profession to welcome "mathematical" methods. It was almost common form in letters to or articles in the medical press for a writer to say that Prof. Pearson's work might be very interesting to "mathematicians, *but*——." By sheer force of personality, "K. P." won his battle almost single-handed. He had indeed a little band of enthusiastic disciples, but he himself was always in the forefront of the battle. And an unfavourable criticism of the work of a pupil was sure to call forth a more trenchant counter-attack than any criticism of his own work. That he was always in the right, that all the methods he invented were useful, all the conclusions he reached correct, and all the opponents he trounced incompetent, nobody would maintain. Like the late Sir Victor Horsley—with whom he once raged battle furiously—he found it hard, in earlier years, to see both sides of a case. Almost the only sign of age noticeable in his later years was a mellowing in this respect.

His influence upon the medical profession has been almost wholly good. Wounds inflicted in controversial warfare have long been healed. The truths that when things *can* be measured and counted they *should* be measured and counted and that often in medical science things *can* be measured and counted much more often than we used to think, have been well learned. Much remains to be done, but, thanks to Karl Pearson, it is easier to do. Burke said that Chatham made the name of Englishman respectable upon the continent of Europe. Karl Pearson made the name of statistician respectable in medical circles. What Farr did for official statistics, Pearson did on a larger scale. There must be universal regret that he is no longer with us. But to pass away suddenly, still full of enthusiasm but conscious that the work he initiated will be continued, is a fitting close of an inspiring life.

LONDON'S PRINCIPAL RHEUMATISM CLINIC

THE latest annual report of the British Red Cross Society's Clinic for Rheumatism, beside Regent's Park, is an account of services rendered and of aspirations to wider activity. The roll of new patients in 1935 was slightly smaller than in 1934, but the numbers of attendances and treatments are the highest so far attained by the Clinic; in the general out-patients' department there were 89,810 and 135,834 respectively, and in the private patients' department 8561 and 12,727. Mounting figures for attendance are not surprising, perhaps, in a clinic of only five years' standing. More remarkable is the fact that the patients discharged with treatment completed were almost as many as the new patients received, and that of the former 50·9 per cent. were cured or free from symptoms, 35·1 per cent. were definitely improved, 13·2 per cent. were unchanged or but slightly improved, and only 0·8 per cent. were worse. The work has increased in almost every department and new undertakings have been started; but any further development in the present building seems to offer considerable difficulty. The facilities for in-patient treatment at St. Stephen's Hospital, where the London County Council has set aside a number of beds for rheumatic patients, have been little used: the report points out that a considerable number of patients requiring in-patient treatment were unsuitable for admission to such a hospital and that for these there was little provision at the teaching and voluntary hospitals. Many were sent to the convalescent homes available, but the medical board think that better results could be achieved at a home especially designed for rheumatic cases. They state their need, therefore, of in-patient accommodation near the Clinic, where patients might be under the care of the visiting physicians, and of a

convalescent home with 20 beds and room for expansion.

Further provision, too, for research, they fairly claim, is essential if real progress is to be made in the treatment of rheumatism. During the year several books and papers have been published based on the results of investigations carried out at the Clinic, and work has been done on such subjects as the sedimentation-rate (as an index of prognosis and of the value of treatment); the treatment of menopausal arthritis; therapy with vaccines, gold, calcium, histamine, and ovarian preparations; colon irrigation; duodenal drainage; and various physical measures. It may be argued that the function of an out-patient clinic, well furnished with the apparatus of physical treatment, is to concentrate rather on therapeutics than on the wider problems of ætiology. But it is natural enough, no doubt, to find the staff of such a clinic yearning for the regular machinery of investigation—in-patient accommodation (with the chance of autopsy), the paid research workers, space for them to work in, and funds. The realisation of these hopes will presumably depend on the generosity of the public.

TWO KINDS OF DIABETES?

THE history of diabetes during the last fifty years offers a good instance of how easily false conclusions can be drawn from biological data. The position of the pancreas in the ætiology of that disease was firmly impressed on the mind of the clinician by the observations of Minkowski and von Mering on pancreatectomy, and the much more recent discovery of insulin served only to strengthen the conviction. It was not until Houssay showed that the symptoms of experimental diabetes could be largely prevented by removal of the pituitary as well as the pancreas, that the pancreatic hypothesis of diabetes began to appear inadequate. The clinician has long recognised two distinct clinical types: a severe form occurring in young subjects, accompanied by wasting and gross ketosis, and a relatively benign form in older patients, in which glycosuria and its concomitant symptoms of thirst and pruritus are the presenting and sometimes the only features. The latter form has been from time to time attributed to some defect of carbohydrate storage, but on the whole the tendency has been to incriminate insulin deficiency in both forms. Elsewhere in this issue Prof. de Wesselow and Dr. Griffiths describe experiments which strongly suggest that the two forms may be ætiologically as well as clinically distinct. Their observations show that the blood of elderly diabetics contains considerable quantities of something which checks the development of insulin hypoglycæmia in rabbits. It is not yet clear what this substance is, but it seems to resemble extracts of the anterior lobe of the pituitary in its effect. This is perhaps the first direct piece of evidence to suggest that a common type of human diabetes may have nothing directly to do with the islets of Langerhans. It is interesting to note that patients in whom the unknown principle is present seem to belong to the group which Himsworth[1] describes as "insulin-insensitive." Himsworth attributes this insensitivity to lack of an unknown factor which sensitises the body to insulin. It is difficult to accept both of these two apparently contradictory views, but further knowledge will no doubt reconcile them. Observations of this kind should stimulate others to pay less attention to the pancreas and more to other endocrine organs in diabetes. It has become almost a platitude to say that no ductless gland can be considered apart from the others. But the general tendency to pin a disease to one gland dies hard.

[1] THE LANCET, Jan. 18th, 1936, p. 127.

INCIDENCE OF POST-VACCINAL ENCEPHALITIS

THE March issue of the *Bulletin* of the International Office of Public Health contains the following information about the recent incidence of post-vaccinal encephalitis in various countries. In Germany 4 cases are reported among 1,200,000 children vaccinated in the course of 1935. A few cases of encephalitis were also observed after vaccination in which it was suggested that activation of a tuberculous infection might be responsible. In England during the period October, 1934, to October, 1935, there was only a single case, which ended fatally, the patient being a woman aged 20. The necropsy revealed characteristic lesions in the brain. In the United States also only a single case was notified during the financial year 1934–35. In Holland, among the 4 patients examined by the neurologists specially appointed for the purpose, the diagnosis was in 2 uncertain and in 1 improbable. The last case was that of a child of 9 months who developed symptoms of encephalitis 28 days after vaccination. Only 17,000 vaccinations were performed in Holland during 1935, so that the proportion of encephalitis cases (1 per 5000 vaccinations) differed little from what it was in previous years. There were only 2 mild cases during 1935 in Sweden, where there have been no deaths due to post-vaccinal encephalitis since 1932. In Switzerland there were 2 cases in 1935 among about 35,000 vaccinated children. These figures show that the incidence of encephalitis after vaccination has been tending to fall in the countries most affected, except perhaps in Holland.

THE biennial dinner of the Royal Society of Medicine will be held on Wednesday, May 6th, at 7.30 for 8 P.M., at the May Fair Hotel, Berkeley-square, London, W.

Dr. J. Godwin Greenfield is to deliver the Morison lectures at the Royal College of Physicians of Edinburgh on Monday, Wednesday, and Friday of next week, at 5 P.M. His title is the Cerebro-spinal Fluid: Some Modern Problems.

WE regret to learn of the sudden death on Monday last of Mr. Albert Carless, consulting surgeon to King's College Hospital and editor of the manual of surgery, originally written in collaboration with the late Mr. William Rose, which maintains under recent editorship its authoritative position.

INSTITUTE OF MEDICAL PSYCHOLOGY.—A week-end course on psychological disorders in childhood will be given on May 9th and May 10th at this institute, Malet-place, London, W.C. Further details may be had from the educational secretary, and the full programme is given in our Medical Diary.

CHILD GUIDANCE COUNCIL.—Three fellowships in psychiatry are offered by this council for half-time work at the London Child Guidance Clinic in Islington. Further information will be found in our advertisement columns, and forms of application may be had from the secretary of the council, Woburn House, Upper Woburn-place, London, W.C.1.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XCIX.—PROGNOSIS IN ARTHRITIS

To the lay mind the prospect before the patient attacked by arthritis of any kind is one of pain, crippling, and deformity, with little or no prospect of relief. Such a prognosis is not justified; in a few cases the disease becomes stationary and dies out without any special treatment, and in a large proportion steady perseverance with appropriate measures will lead to the same result, though if care has not been taken to counteract the effects of muscle spasm or atrophy some deformity will persist. In a few cases, probably less than 10 per cent., the disease follows a relentless course to complete crippling before it burns itself out.

The prognosis in osteo-arthritis is essentially different from that of rheumatoid, and all the cases included under the latter head do not present the same characters or tend to run the same course.

Age has a bearing on the incidence and course of both types, but it must be remembered that though rheumatoid arthritis is generally a disease of young adults it may appear later in life, and the condition is not infrequently seen beginning in the sixties or even later; while the first signs of osteo-arthritis may appear in the late thirties or early forties. To draw a sharp distinction may indeed be difficult, for the hypertrophic changes of osteo-arthritis, the formation of osteophytes, and the increase in the density of the bones as shown by the X rays are sometimes the late result of an arthritis of infective origin or of gout, and are in the nature of a reparative process, nature's method of reinforcing weakened ligaments where the active disease has died out. On the other hand, they may indicate a degenerative process due to lowering of local or general resistance to ordinary wear and tear, accelerated perhaps by toxic absorption, and mixed cases are not uncommon in the middle years from such causes. In this group should be included the so-called climacteric arthritis which attacks knee-joints in middle-aged women and here an endocrine deficiency probably plays a part of some importance.

Rheumatoid Arthritis

Rheumatoid arthritis is probably the result of a low-grade infection due to a relatively non-pathogenic microbe which has been enabled to attack the joints or other structures by reason of some factor lowering resistance or possibly sensitising the tissue cells to the specific infective agent. Such factors are to be looked for in the conditions of life, unhygienic dwellings or occupations, unsuitable diet due to poverty or to wrong ideas and tastes, excessive fatigue with lack of fresh air and recreation, nervous strain or shock due to prolonged anxiety, bereavement, and so forth. Sensitisation may result from septic foci of long standing, and it must be remembered that if from any cause resistance is lowered, tissues other than the joints may be attacked and pyorrhœa, for example, may be set up side by side with the arthritis and not (as is often supposed) be in itself the main ætiological factor. The general build of the patient must not be overlooked as a prognostic guide; the slender, flat-chested visceroptotic type with defective circulatory tone, poor capillary circulation, cold hands and feet, probably chronic constipation and frequently achlorhydria, capricious appetite, and poor digestion is especially liable to develop arthritis of a severe type. Upon a properly directed and vigorous attack on such predisposing factors the prognosis will materially depend. The one indisputably sound line of treatment in all cases is to raise the patient's resistance to a point which will enable the infection to be overcome, and the principles which have revolutionised the prognosis and treatment of tuberculosis must be applied in rheumatoid arthritis. The earlier the patient is brought under the influence of treatment along these lines the better the prospect is likely to be, but even when the disease has become well established arrest, if not cure, can be looked for in a large proportion of cases.

GENERAL MEASURES

Rest should be the key-note. In early cases, in those with pain and swelling of joints of any severity, in those with pyrexia however slight, in fact in all in which the disease is definitely active, this will mean bed for most of the day and often all the time for some weeks. The inflamed joints should be put up in plaster for a short period (not less than two nor more than six days) when the plaster should be bivalved to permit of gentle movement, preferably active rather than passive, in order that circulation and muscular tone may be improved. The splints must be worn at night and often for much of the day as well in order to counteract any tendency to deformity. With rest must be combined suitable diet on the general principle of moderate restriction of carbohydrates but free consumption of milk, cream, eggs, meat, vegetables, and fruit, aiming at an ample but balanced vitamin supply, for which purpose cod-liver oil will be found a useful addition. Suitable physical treatment to treat constipation, to improve the peripheral circulation, and to re-educate the muscles is also essential and with perseverance along these lines great improvement is likely to be obtained and the patient prepared for further treatment if necessary.

Pemberton's figures of a series of patients with both types of arthritis at all stages who were placed on this line of treatment are remarkable: of 300 cases 89 per cent. were improved, 57 per cent. "definitely," and 32 per cent. "greatly"; 6 per cent. were cured (Jour. Bone and Joint Surgery, xvii., 4, 879). The proportions were similar in both types of arthritis and many of the patients had tried many other lines of treatment before this régime was instituted.

SUBSIDIARY MEASURES

The treatment of *focal sepsis* cannot be ignored but will be more effective and less liable to untoward results if carried out in connexion with the general treatment outlined above. Sometimes the removal of teeth or tonsils is followed by most remarkable improvement or even cure, but occasionally by a temporary increase in symptoms due to absorption of toxic material from the raw surfaces. The removal of septic foci can rarely be complete, but if the major ones are adequately dealt with the improvement in resisting power from general measures will keep the minor ones in check and the microbes may continue to exist as saprophytes until some circumstance leads to a renewal of their activity. The joints themselves may be the foci from which a fresh general infection develops. The importance of a

chronic inflamed gall-bladder or appendix must not be overlooked.

It is outside the scope of the present article to discuss the value of *vaccines* in any detail, but in view of their wide use it is necessary to say that vaccines have in many cases done much more harm than good, chiefly through excessive dosage. It may, in my opinion, be laid down as a principle that any reaction to vaccine is an indication for reduction of dose to a level which produces no reaction. Vaccines should be used as desensitising agents, and the best results may be obtained by a progressive reduction in dosage rather than by increase. Large doses may sensitise the tissues, lower the resistance, and thus cause the disease to become rapidly worse. By the use of minimal dosage no harm is likely to result; and even if there is no evident specific effect the patient feels that a definite line of treatment has been thought out and is being pursued, and gains encouragement from this fact and with it a real increase in power of resistance. One American authority of wide experience has said that though he is doubtful if vaccines have any specific effect he uses them in small doses in order to keep the patient under continual observation, and thus to be able to direct and control a general line of treatment.

Gold treatment is another method holding out definite prospect of good results if used cautiously, but it has often in the past been given in too large doses without sufficient precautions, and has thus fallen somewhat into discredit.

The *course of the disease* in all its forms is often characterised by remissions in the symptoms without any obvious cause; pyrexia especially is apt to be variable. The attack may appear to subside, the joints become less painful and swollen, and in early cases there may be an apparent recovery only to be followed by a fresh outbreak which may not subside until the joints have been permanently and seriously damaged. Such relapses may be caused by excessive fatigue, anxiety, or any depressing influences such as an attack of influenza or similar disease. Patients should, therefore, be kept under observation for months after the disease appears to have become stationary, and warned to lead a careful life on lines laid down for each case. The administration of cod-liver oil, especially during the colder months is, in my experience, a most useful measure. Apart from its effect on nutrition it lessens the liability to catarrhal attacks which are so often followed by recrudescence of the arthritis.

An *optimistic attitude* on the part of the doctor is a factor of much importance; the effect of depressing influences such as a lack of therapeutic resource does much to weaken the patients' power to fight the disease.

PROGNOSIS AS REGARDS MOBILITY

In most of the cases treated on the above lines by splinting and rest together with local heat, massage, and re-education of the muscles, there will be little deformity, but in a small proportion of them this happy result will not be obtained, and further measures will be required.

The characteristic deformities are due to contraction of the joint capsule or to adhesions between the joint surfaces, together with malposition induced by atrophy of some muscles and overaction of their opponents. Though rest is enjoined, movements should be carried out from the beginning in a systematic manner once or twice a day and should be active whenever possible, as this will help to maintain the tone and nutrition of the muscles. Massage will aid in this direction, but it is better not to massage the joints themselves though very light friction with analgesic liniments may be permitted.

Knee and hip-joint.—The knees are often kept slightly flexed, as this is the most comfortable position for the patient, and there is consequently a danger of loss of full power of extension through contraction of the posterior ligaments. Weight extension will overcome this, if applied early, and is often effective in relieving pain both in knees and hips by keeping apart the inflamed articular surfaces while permitting movements to be carried out. When this can be dispensed with a light splint should be worn at night for a time. If straightening cannot be effected by these means the use of a succession of light plaster shells to support the joint, at each stage being made a few degrees straighter as the limb accommodates itself to the support, may prove successful. In more severe cases the operation of synovectomy may be employed, especially if there is a thickened and painful synovial pad behind and around the patella. Where the defect is due to contraction of the posterior ligament a plastic capsulectomy is sometimes useful. As a last resort, excision of the joint and fixation in a straight position may have to be adopted.

Forcible movement of joints under an anæsthetic is always accompanied by the risk of waking up the acute process which had become quiescent. It is obviously of no service where bony ankylosis or much thinning of the cartilage is evident from a radiogram, but in early cases where limitation of movement has resulted from adhesions and capsulitis the results may be very satisfactory.

The same principles apply to the treatment of *other joints.* There is difficulty in maintaining full and regular movement in an inflamed shoulder or elbow, and excision of the joint may become necessary if ankylosis occurs in such a position that the hand cannot be brought to the mouth. Pronation and supination may be restricted by adhesions in the radio-ulnar joint or in the wrist. The wrists are very frequently the seat of arthritis and rarely escape some restriction of movement, but much can be done for them by such measures as have been described. Light cock-up splints to be worn at night are often desirable. It is necessary to remember that a stiff wrist may be more useful than a weak one resulting from forced movement. If support is needed when the patient resumes walking elbow crutches are preferable to sticks, which throw a strain on the wrists and tend to cause pain and distortion as well as a faulty carriage of the body. When the ankles are affected care must be taken to avoid foot drop while the patient is in bed. When the mandibular joint is affected a screw wedge, which should be used by the patient himself, will help to secure better movement. For the fingers special splints have been devised to apply traction, but good results may be obtained by a little ingenuity with elastic bands. Occupational therapy is often of great assistance if carefully devised and directed.

Local heat will help as a preliminary to movement, and moist heat is often more effective than dry. Hot baths, both local and general, with the addition of common salt, soda, or Epsom salts often give much relief, and movements can be carried out more easily when the limbs are supported by water. Poultices are useful for knees and elbows, and these simple measures are often more useful than more

(*Continued at foot of next page*)

SPECIAL ARTICLES

PAGET'S DISEASE OF THE NIPPLE

BY J. PATERSON ROSS, M.S., F.R.C.S.

PROFESSOR OF SURGERY IN THE UNIVERSITY OF LONDON
DIRECTOR OF THE SURGICAL PROFESSORIAL UNIT,
ST. BARTHOLOMEW'S HOSPITAL

THE clinical features of Paget's disease of the mammary areola are well recognised, but the views held with regard to its pathology are often vague or erroneous. In spite of painstaking research by Cheatle and by Muir, some text-books are still disseminating misleading and fallacious opinions about the relationship of Paget's disease to carcinoma of the breast, and it has even been suggested that the skin lesion may not be a pathological entity. Such misconceptions and the consequent uncertainty about the treatment of Paget's disease must be the excuse for this brief review of the subject.

IS PAGET'S DISEASE A PATHOLOGICAL ENTITY?

Paget's disease of the nipple is frequently referred to as "eczema," but it differs from simple dermatitis in that it does not spread beyond the areola, it is resistant to all methods of treatment, and it has a characteristic histology, the epithelium containing numerous large clear vacuolated cells which are not found in simple inflammatory lesions of the skin. It must be understood that Paget's disease is not peculiar to the skin of the nipple, and Susman has collected 34 cases which occurred in other parts of the body, most commonly on the skin of the perineum and external genitalia.

Susman (1928) laid special stress on Paget's disease of the glans penis, describing a case of his own which he added to 6 others which had been described previously. Though the clinical details of some of these earlier cases are incomplete it is clear that the nature of the lesion was well established, and in all of them there was a red moist shiny area surrounding the external urinary meatus. The average duration of the disease before the patients presented themselves for examination was two years, and in none of the records is there any mention of previous lymphatic obstruction or œdema. In 3 cases, it is stated, the neighbouring lymphatic glands were not involved late in the disease. Most of the notes refer merely to diagnosis and only 2 record the late results of treatment. In both these cases partial amputation of the penis was performed, and though the patients seemed to do well for a time they eventually died of uræmia resulting from carcinomatous stricture of the remaining portion of the urethra. The illustrations accompanying this article show that the macroscopic and microscopic appearances of Paget's disease in this situation are identical with those of Paget's disease of the nipple.

The term *dermatitis maligna* has the virtue of pointing out that Paget's disease of the nipple is malignant. But to call it "dermatitis" is a misleading half-truth, for although there is an inflammatory reaction in the cutis vera of the areola, this term suggests that the disease is confined to the skin, whereas similar changes are occurring simultaneously in the epithelium of the ducts of the breast.

IS PAGET'S DISEASE A COMPLICATION OF A SUBJACENT CARCINOMA OF THE BREAST?

The title of Paget's original paper in St. Bartholomew's Hospital Reports, "On Disease of the Mammary Areola preceding Cancer of the Mammary Gland," might be regarded as a sufficient answer to this question. Further inquiry, however, is called for, since there are still many teachers who cling to the hypothesis that the skin lesion is a sequel to a carcinoma beneath the nipple, being the result either of blockage of skin lymphatics by permeation, or of irritation of the surface epithelium by cancerous exudates.

Clinical records are unanimous in stating that the nipple lesion is present for a long period, sometimes for many years before carcinoma is palpable in the breast. In support of Paget's own statement to this effect there is a series published by Bowlby in 1891 in which out of 22 patients 9 showed no tumour in the breast when they presented themselves for treatment many months after the onset of the disease. During the ten years 1925–35 there have been 8 cases of Paget's disease of the nipple in the wards of St. Bartholomew's Hospital, and in 6 of these a tumour could not be felt in the breast.

CASE REPORTS

1. A. B., aged 63. Single. June, 1923, eczema of the right nipple. March, 1925, breast excised. Section of nipple showed Paget's disease, but no carcinoma could be found in the breast. The patient died in 1934 without recurrence of disease.

2. C. D., aged 61. Single. December, 1924, eczema of right nipple. February, 1926, breast excised. Section of nipple showed Paget's disease, but no carcinoma could be found in the breast. Patient cannot be traced.

3. E. F., aged 66. Married, five children. May, 1925, eczema of the right nipple. November, 1926, nipple destroyed but no lump palpable in the breast. Breast excised. Section of the nipple showed Paget's disease, and dilated ducts were found deep to the nipple. A focus of spheroidal-celled carcinoma was discovered histologically. May, 1929, recurrence of carcinoma in scar; February, 1931, died with metastases in liver.

4. G. H., aged 58. Married, two children. June, 1927, eczema of the right nipple. June, 1930, nipple replaced by sore area, but no lump palpable in breast. Breast excised. Section showed Paget's disease of the nipple, and the ducts close to the nipple showed dilatation and cellular hyperplasia but no carcinoma was found. October, 1935, spheroidal-celled carcinoma appeared in the scar and in the right axillary glands.

5. I. J., aged 68. Single. January, 1927, eczema of the right nipple. July, 1929, nipple partially destroyed but no lump palpable in breast. Section from nipple showed Paget's disease. Three radon seeds (1·5 m.c.) inserted deep to nipple. September, 1929, nipple lesion healed. December, 1931, no evidence of disease on nipple or in breast. Patient cannot be traced.

6. K. L., aged 55. Married, no children. July, 1934, eczema of the right nipple. February, 1935, nipple destroyed but no lump palpable in breast. Section of nipple showed Paget's disease. Enlarged supraclavicular gland excised and found to be carcinomatous. X ray treatment to chest, but in July, 1935, the patient died with visceral deposits of carcinoma.

(*Continued from previous page*)

elaborate methods, with the advantage that they are inexpensive and available in every household, a matter of importance when treatment must be carried on for many months. The utmost perseverance will be demanded from doctor and patient, and if this is forthcoming the improvement will often astonish both.

C. W. BUCKLEY, M.D., F.R.C.P.,
Hon. Physician, Devonshire Royal Hospital, Buxton, and to the Buxton Clinic for Rheumatic Diseases.

(*To be continued.*)

The tumour when it does appear may be found in any part of the breast, and is frequently remote from the nipple; there is no statistical evidence to favour the view that Paget's disease occurs when the tumour is closely related to the areola. Further, it is significant that no mention of pre-existing subjacent carcinoma has been made in the accounts of Paget's disease in other parts of the body.

A superficial carcinoma of the breast infiltrating the skin may resemble Paget's disease clinically, but histological examination reveals the true nature of the disease. This difficulty has not always been recognised, even in publications, and is undoubtedly responsible for some of the existing confusion.

On anatomical grounds it is hard to understand how a growth deep to the nipple could block the lymphatics of the areola, from which drainage is provided by vessels which run over the surface of the breast to enter the deep lymphatics at its periphery. The characteristic *peau d'orange* resulting from lymphatic blockage is associated with extensive disease in the breast, and is always regarded as one of the most serious features influencing the prognosis of carcinoma. But it cannot be too strongly emphasised that *peau d'orange* is neither a precursor nor even an accompaniment of Paget's disease.

The discharge which sometimes occurs from the ducts in chronic mastitis can cause simple eczema of the nipple, but there is no evidence that Paget's disease can result either from such a discharge or from the exudate of a carcinoma. If it were so Paget's disease might be expected to be more common. Injury and simple inflammation of the nipple do not seem to be factors, since Paget's disease occurs with equal frequency in women who have and those who have not borne children.

IS PAGET'S DISEASE OF THE NIPPLE FOLLOWED BY CARCINOMA OF THE BREAST?

Though a variable and often a long period of time may elapse between the appearance of the nipple lesion and the discovery of a tumour in the breast this question must be answered by an emphatic affirmative. Both Cheatle and Muir have given detailed descriptions of the hyperplastic changes in the epithelium of the ducts which are always to be found in cases of Paget's disease. The histological changes observed in the epithelium of the nipple and of the ducts are essentially malignant in nature.

Muir believes that the disease commences as carcinoma in the ducts close to their orifices, and that the nipple is involved by intra-epithelial infiltration from them. Cheatle regards the cellular phenomena in the skin and the ducts as the response to a common carcinogenic agent. If the fundamental conception that there is malignant disease in both situations be accepted, the question of their exact interrelationship may be regarded as a matter more of academic interest than of practical importance. The occurrence of Paget's disease in other parts of the body suggests that the production of the superficial lesion is not dependent upon the extension of a neoplastic process originating deep to the skin.

Cellular hyperplasia extends deeply into the breast along the ducts and, though malignant from the start, growth is confined for a time within their epithelial lining. Eventually, however, these abnormal cells burst through into the breast substance, it may be at a considerable distance from the nipple, and a carcinoma develops which resembles in every respect, both in its morphology and in its natural history, the usual carcinoma of the breast. The cellular changes in the ducts and the earliest stages of the resultant carcinoma are clinically impalpable, and it is therefore possible for metastasis to occur before a lump is discovered in the breast.

The intimate relationship between Paget's disease and carcinoma is not confined to the breast, and both Paget and Susman refer to carcinoma of the urethra following Paget's disease of the glans penis.

HOW SHOULD PAGET'S DISEASE OF THE NIPPLE BE TREATED?

Experience has shown that excision of the nipple is futile, and though excision of the breast alone may sometimes eradicate the disease, complete removal of the breast, pectoral muscles, and axillary glands is the safest method of treatment. Thorough irradiation of the whole breast and the areas of lymphatic drainage may be considered as an alternative, but when the primary growth cannot be identified as a circumscribed lump radium treatment is less satisfactory than amputation of the breast.

Study of the eight cases already mentioned is instructive, for in three the treatment adopted was simple excision of the breast. There was no tumour to be found in the specimens after operation. One patient lived for nine years and died of heart failure; one cannot be traced; but the third returned five years after operation with spheroidal-celled carcinoma in the operation scar and in the axillary glands. A tumour was found in the breast after operation in two cases. In one of these the patient was treated by radical amputation of the breast, pectoral muscles, and axillary glands, but five years later she died with visceral deposits of carcinoma; and in the other the breast and lymphatic areas were irradiated, the disease of the nipple and the lump in the breast disappeared, but the patient died with visceral metastases two years later. One patient who was very obese had Paget's disease of the nipple, a lump could not be felt in the breast, but an enlarged supraclavicular gland was found to be filled with spheroidal-celled carcinoma. The breast, axilla, and mediastinum were treated with X rays but she died six months later with cerebral metastases.

It seems justifiable to conclude from such experiences and from the results of pathological research that Paget's disease of the nipple is evidence on the surface of an associated carcinomatous process in the breast; and since this deeper process can spread into the breast substance and even to the nearest lymphatic gland before there is any palpable evidence that it is no longer confined within the epithelial lining of the ducts, the disease must be treated by immediate radical removal of the breast with the axillary glands.

Complete and beautifully illustrated descriptions of the pathological changes which occur in the skin and in the ducts of the breast are given in the following articles:—

Cheatle, G. Lenthal: Brit. Jour. Surg., 1923, xi., 295.
Muir, R.: Ibid., 1935, xxii., 728.
Susman, M. P.: Ibid., 1928, xv., 635.

LOWESTOFT AND NORTH SUFFOLK HOSPITAL.—There is a nursing staff here of 32 nurses but only 30 beds for their use, so that unless two nurses are always away on leave, beds must be hired outside the hospital. An appeal for £20,000 is being launched for the provision of a nurses' hostel and other improvements to the hospital.

RADIOLOGY IN THE CURRICULUM

THE section of radiology of the Royal Society of Medicine, which has been considering the place of radiology in the medical curriculum, has now sent in its recommendations to the curriculum committee of the General Medical Council. These recommendations are based on a report to the section of a committee made up of Dr. F. M. Allchin, Mr. J. F. Carter Braine, Mr. Rock Carling, Dr. N. S. Finzi, Prof. F. R. Fraser, Dr. F. Hernaman-Johnson (chairman), Dr. G. Harrison Orton, Dr. Russell J. Reynolds, Dr. C. G. Teall, Dr. E. W. Twining, and Dr. Douglas Webster.

Recommendations

I. Instruction in the physics of radiation should be given in the preclinical period.

II. Radiology should be utilised where practical in the teaching of anatomy, physiology, and pathology.

III. Instruction in the scope of X rays in diagnosis, and of X rays and radium in treatment, should be required during the clinical period of the curriculum. This may be accomplished by :

(*a*) Combined teaching by clinician and radiologist in ward rounds at the invitation of the physician or surgeon.

(*b*) The radiologist conducting demonstrations in the X ray department on selected films. Physicians and surgeons should attend these demonstrations and take part in the discussions.

(*c*) A number of lecture-demonstrations by a radiologist being included in the courses of lectures on medicine and surgery.

(*d*) The formation of an exhibition of radiograms illustrating typical cases.

The scheme adopted can best be left to the individual schools to decide upon, but a combination of either (*a*) or (*b*) with (*c*) and (*d*) would be most satisfactory. No opinion is offered as to the precise amount of time which should be spent on the teaching of radiology ; a schedule sets out the wide differences in the time devoted to organised teaching in British schools to-day. In some schools instruction is given in diagnosis only, in others in radiotherapy only ; any regulations which are framed should specify instruction in both divisions.

Summary of Present Position at Home

RADIOLOGICAL ANATOMY is now taught to undergraduates at :

- University College Hospital.
- St. Thomas's Hospital (one hour daily by X ray assistant).
- St. Bartholomew's Hospital (about 30 lectures).
- Guy's Hospital.
- Oxford.
- Cambridge (and with physiology).
- St. Andrews.
- Dundee.
- Manchester.
- Birmingham.

LECTURE COURSES in radiology are given to undergraduates at :

- London Hospital (weekly through final year, and ward demonstrations).
- St. Mary's Hospital (11 lectures in autumn term, demonstrations in X ray department).
- Middlesex Hospital (11 lecture-demonstrations in autumn term).
- Charing Cross Hospital (6 to 8 lectures).
- St. George's Hospital (short course of lectures, and frequent demonstrations).
- King's College Hospital (3 or 4 introductory lectures —supplementary course later).
- St. Bartholomew's Hospital (3 lectures in therapy only).
- Guy's Hospital (8 lectures in diagnosis only).
- Liverpool (11 lecture-demonstrations).
- Manchester.
- Leeds.
- Durham (6 lectures each term).
- Dundee (occasional lectures, with clinical medicine course).
- Glasgow (20 meetings and demonstrations).
- Birmingham.

ATTENDANCES in the X ray department are required of undergraduates at :

- Charing Cross Hospital (3 months as clerk).
- Royal Free Hospital (1 month as clerk).
- University College Hospital (a fortnight as clerk).
- Westminster Hospital (12 attendances).
- (In these hospitals attendances are all compulsory ; students must be signed up.)
- St. Thomas's Hospital (demonstrations).
- Middlesex Hospital (clerks appointed).

And Abroad

For comparison a summary is appended of instruction in radiology as at present given in the United States of America and in Sweden.

United States of America.—There are 53 Class A medical schools, in about half of which instruction in radiology is given in the second year (average 10 hours) with anatomy and physiology. In 80 per cent. in the third year (average 30 hours), a general exposition of roentgenology. In 98 per cent. in the fourth year (average 25 hours), clinical applications. And in 42 per cent. laboratory courses are given in addition to the lectures.

Sweden.—Compulsory course : one term in X ray diagnosis (about 20 hours, lecture-demonstrations). Optional course : for eighth to tenth year students, 2 months' course (about 44 hours, X ray diagnosis and X ray and radium therapy).

MEDICINE AND THE LAW

Litigation Over Sale of Practice

IN litigation over the sale of a medical practice (With *v.* O'Flanagan) the Court of Appeal last month gave a decision which is likely to be noted in the text-books on the law of contract. It was a London practice, carried on at two different premises. The prospective purchasers naturally obtained information beforehand about the value. They were told that the practice had produced £2000 a year and that the number of panel patients was 1480. They agreed to pay £4000 (two years' purchase) as the price of transfer. The date for completing the contract of purchase was May 1st, 1934. During the four months preceding that date the vendor was obliged by illness to be absent from his work. He managed to return occasionally and worked for about 30 days at one of the premises ; meanwhile the practice was carried on by other doctors acting as locum tenens. One of the latter, who was acting from April 10th to May 1st, gave an account of the practice which showed that conditions had changed since the figures had originally been given to the purchasers. The average takings were said to be as low as £5 a week, and the panel patients had dropped to 1250. The vendor became very ill and died. The purchasers, finding that they had bought something which was worth very little, brought proceedings

against his executors, asking for rescission of the contract. Mr. Justice Bennett held that the vendor had been aware of the altered value of the practice and that the purchasers had not been told of the change. But he dismissed the claim for rescission, apparently on the ground that the representations were true at the time when they were made and that the buyers had no legal right to be told of the altered value.

Some observations of Sir Edward Fry in Davis *v.* London and Provincial Marine Insurance Co. (1878) seem material. When parties contract with one another, he said, they may (unless there is a duty to disclose facts) observe silence even as to matters which each thinks would operate on the other's mind. There is, however, a duty to disclose when an agent is contracting with his principal, a solicitor with his client, a guardian with his ward, or a trustee with the person towards whom he stands in a fiduciary relation. The agent, solicitor, guardian, or trustee can in these circumstances contract only after the most ample disclosure. Then there are contracts sometimes called contracts *uberrimæ fidei* (of the utmost good faith) where the courts will specially require disclosure from one of the contracting parties—such as contracts about marine insurance or partnership. Lastly, in ordinary contracts the duty of disclosure "may arise from circumstances which occur during the negotiations. If a man makes an honest misstatement of fact on some material point and during the negotiations he discovers it is wrong, he has a duty to correct his misstatement, although, if he had never said anything at all, he might have been entitled to hold his tongue." So again, continued Sir Edward Fry, "if a statement has been made which is true at the time, but which during the course of the negotiations becomes untrue, then the person who knows that it has become untrue is under an obligation to disclose to the other the change of circumstances." Following these views the Court of Appeal has overruled Mr. Justice Bennett. The judges say that the change in the circumstances of the practice ought to have been communicated to the prospective purchasers before they were allowed to close the transaction. The contract could not stand. Put in another way, the representation about the value of the practice, which had induced the purchasers to enter into the contract, was a continuing representation. As was remarked in the old case of Kay *v.* Smith, "the representation does not end for ever when the representation is once made; it continues on." The Court of Appeal has now decided that the purchasers are entitled to a declaration rescinding the contract of purchase. It is a situation which might often be created on the transfer of a practice.

Penal Servitude for Bogus Doctor

Edward Waugh Atkinson, aged 51, a male nurse, pleaded guilty at the Central Criminal Court last week to a charge of obtaining £124 10*s.* by false pretences, and was sentenced to five years' penal servitude. Though he was apparently not charged with infringing the Medical Act, he had assumed the description of doctor in order to impose upon his victims. He caused telegrams to be sent to himself describing him as possessing medical qualifications; he borrowed £10 to buy a stethoscope, and he introduced himself as a doctor. He even gave surgical treatment to a woman from whom he obtained £44, extracting pieces of bone from her injured shoulder. The prisoner asked that four other outstanding charges might be taken into account. The police told the court that he had seven previous convictions, including two terms of penal servitude. In passing sentence the Recorder referred to him as a menace to the public.

Some people may draw the moral that any untrained person can perform a surgical operation with success. Others may deduce that the Medical Act is not without its value. Apart from any question of professional training, the presence of a name on the Medical Register is some evidence of the owner's non-criminal character. Those who summon a registered practitioner to their houses need not, we hope, lock up the spoons.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

DIMINISHING PRIVATE PRACTICE

THE increasing number of patients who attend for treatment at the Glasgow Ear, Nose, and Throat Hospital has necessitated the building of an extension which will cost about £25,000. Comparison with the figures of eight years ago shows that the number of patients attending the hospital for treatment has increased by 34 per cent.; in 1935, 14,746 new patients received treatment. In moving the approval of the medical report, Dr. John Dunbar said that the medical staff must view the growing attendances in no very favourable light. It meant that the medical staff must be increased to cope with the position and showed that the scope of private practice was becoming steadily less. He said that the surgical staff did not object to treating patients who could not afford to pay, but they did object to being exploited. Dr. Hinton Robertson, who seconded the motion, said that there was a large and growing body of opinion in the medical profession, particularly among the younger generation, which was uneasy about the present trend towards hospitalising increasing numbers of the sick population. This would lead to an economic deadlock, for the hospitals would require so many doctors to carry on the work that they would be far in excess of the number that could be maintained by the remaining private patients. As it is, the profession has tended in recent years to incur a certain amount of odium because pressure of circumstances had converted its members into Robin Hoods who rob the rich to pay the poor.

The exploitation of the voluntary hospital by many who are able to pay for medical attention is becoming increasingly apparent. The number of medical and surgical specialists has to be increased to meet the extra work, while the scope of private practice is steadily diminishing. The payment of the staffs in voluntary hospitals seems to be an inevitable result that should not be much longer delayed. The appointment of almoners who can investigate the income of patients attending hospitals has become a real necessity.

CHAIR OF DENTISTRY

At a meeting of the university court of St. Andrews it was announced that a sum of about £17,500 has been offered to the University towards the establishment of a chair in dentistry. The donor is Mr. William Boyd who has already subscribed liberally towards improvements in the Dundee dental hospital, and his offer was gratefully accepted by the court. The annual income of the sum provided will amount to about £500 per annum.

IRELAND

(FROM OUR OWN CORRESPONDENT)

UNIVERSITY REPRESENTATION IN DÁIL EIREANN

LAST week the Dáil took the final step in the abolition of university representation in that assembly. It is nearly two years since the Bill passed the Dáil, and was rejected by the Senate. The power of the Senate, however, is only to hold up a Bill temporarily, not to reject absolutely, the period of suspension being limited to eighteen months. At the expiration of that period early this year the Bill was again sent up to the Senate which gave it a second reading, but amended it by introducing a section which postponed its coming into effect until six months after the next general election. The Dáil refused to assent to the amendment, and last week exercised its power by resolution of "deeming the Bill to be passed by both Houses" when the period of six weeks had elapsed from the second reading of the Bill from the Dáil to the Senate, and the latter body had not passed it. The Bill now becomes law on receiving the signature of the Governor-General.

There are two universities in the Irish Free State, the University of Dublin (best known as Trinity College, Dublin) and the National University of Ireland. Dublin University has had the privilege of representation since 1613, a little more than twenty years from its foundation. Its members sat in the Irish Parliament up to the date of the Union in 1800, from which time until 1921 they sat at Westminster. The National University was first given the right of representation in 1918. By the Constitution of the Irish Free State which came into force in 1923 each university was privileged to return three members. At present Dublin University is represented by two fellows of Physic College and a professor of the School of Trinity; the National University is represented by two barristers and a writer. The Bill does not become effective until the next general election.

DEAN OF THE SCHOOL OF PHYSIC, TRINITY COLLEGE, DUBLIN

Dr. Joseph Warwick Bigger, professor of bacteriology and preventive medicine since 1924, has been appointed dean of the medical faculty, Trinity College, Dublin, in succession to the late Prof. A. F. Dixon. Dr. Bigger has also succeeded Dr. Dixon as representative of the University of Dublin on the General Council of Medical Education and Registration.

PANEL AND CONTRACT PRACTICE

Drugs in Lancashire

WE have repeatedly referred to the growth in Lancashire of the habit of taking medicines. The insurance committee has had a report prepared on the cost and frequency of prescribing during the year 1935. This report quotes the opinion of the C.M.O. of the Ministry of Health that, while a certain increased demand is to be expected from the extending use of costly, though necessary, modern methods of treatment, a considerable proportion of the total outlay on drugs could be eliminated without detriment. Nor can he find evidence that the standard of health is higher in areas where the habit of taking medicines is highly developed. The report points out that during the last five years only one doctor under agreement with the Lancashire committee has been surcharged on the grounds of excessive prescribing; indeed, since the inauguration of the present system twelve years ago, money has been only withheld on four occasions. During the same period the cost of drugs has increased from 34 to 41 pence per person per year, and the number of prescriptions from 3·87 to 5·05. In the seven regions into which Lancashire (apart from its county boroughs) has been divided by the Ministry of Health for the purpose of investigation, the estimated average total cost of drugs per insured person varies from 37·36 to 51·45 pence while the number of prescriptions ranges from 4·74 to 6·14. It is curious to note that the average drug cost in non-mortgaged practices in Lancashire is 40·78 pence, against 44·23 in mortgaged practices. There are fortunately six times as many insured persons in the former category. Practitioners with colonial qualifications, it seems, show a rather heavier return than home-qualified men, while those who have qualified between 1926 and 1935 are definitely more generous with drugs than their elders. It might have been anticipated that small lists would show a heavier average drug cost than the larger ones, but actually the heaviest total (44·08 pence) is in panels of 2500 to 3000. Moreover in medical lists which are rapidly increasing there is a rising cost per person; where for instance the practice is grows by one half in the year the average cost for drugs per person is nearly 70 pence. The insured person does not as a rule trouble to secure acceptance or transfer unless he requires treatment. The committee which drew up the report believe that a substantial economy would follow upon a careful investigation of the prescribing of doctors (1) who have qualified since the war; (2) whose medical lists are rapidly increasing; (3) whose practices are mortgaged; (4) whose lists exceed 2000; (5) who practise in the district around Manchester. They would like the panel committee to examine the data from a therapeutical standpoint.

Appliances at Cost Price

A correspondent in the *Chemist and Druggist* draws attention to what he describes as the custom of a few doctors. Those practitioners who have ordered appliances other than those scheduled, or perhaps foods, on insurance prescription forms, will remember that if the chemist supplies what is ordered he is entitled to be paid and the cost is recovered from the doctor. This particular chemist has noticed that certain doctors are in the habit of ordering expensive appliances, and cheerfully accept the surcharges. He has made inquiries and one doctor gives the following explanation:—

> "Let us take a proprietary inhalant as an example. The medicament I order is allowed as a charge on N.H.I. funds, but the cost of the atomiser or inhaling apparatus that the makers recommend is not a proper charge. If my patient wants it he must pay for it himself, and it may cost him 21*s*. Now, suppose I order it on a prescription form with the liquid medicament. The patient gets the inhaler just the same and they charge it to me, but only at cost price (according to drug tariff rules). The patient in turn pays me for it, and saves, say 5*s*. on the transaction; the value is deducted from my next cheque, so everybody is satisfied!"

The chemist is not so sure that everyone is satisfied He has supplied a non-scheduled appliance, and instead of receiving his normal profit on the transaction he has to be content with a mere dispensing fee. But the idea is ingenious.

OBITUARY

SIR WILMOT HERRINGHAM, K.C.M.G., C.B., M.D. Oxon., F.R.C.P. Lond.

THE death occurred on April 23rd of Sir Wilmot Herringham, consulting physician to St. Bartholomew's Hospital, and widely known for his services to medical education and nursing, while his war record was of marked distinction.

Wilmot Parker Herringham was the son of the Rev. W. W. Herringham, of Old Cleeve, Somerset, a prebendary of Wells, by Matilda, daughter of the late Colonel J. B. Parker, commandant, Woolwich. He went to Winchester as a colleger and gaining a classical exhibition at Keble College, Oxford, graduated with classical honours in 1877. A decision to go to the Bar was marked by entrance as a student at Lincoln's Inn, but almost immediately he decided on a medical career and became a student at St. Bartholomew's Hospital. He qualified as M.R.C.S. in 1881 and graduated as M.B. Oxon. in the following year, taking also the diploma of M.R.C.P. Lond. He served as medical registrar at the hospital and was for two years casualty physician, but as was so commonly the case at his school had to wait a period for advancement, not being elected assistant physician to St. Bartholomew's until 1895. He was however elected physician to the West London Hospital and to the Paddington Green Children's Hospital, at both of which institutions he did excellent work. And he had to wait no excessive time at St. Bartholomew's for promotion, as he became full physician in 1904. He lectured for a time on clinical and forensic medicine and published papers on clinical subjects in the transactions of various learned societies and in the columns of the *Journal of Physiology*, *Brain*, and the *British Medical Journal* and the *St. Bartholomew's Hospital Reports*, but no manual or textbook came from his hand.

SIR WILMOT HERRINGHAM

Herringham was elected F.R.C.P. Lond. in 1889, and was examiner for the College through two periods. In the course of his educational and hospital work he became deeply interested in the constitution and machinery of the University of London. The controversies involved made bewildering reading at the time, and even when the statutes and regulations made by the Commissioners of the University of London Act (1898) were published few could have followed their meaning, their implications, or their indications for development with any certainty. Herringham was among that small group and displayed in debating the difficulties of organisation a blend of fairness and acumen which led to his election to the vice-chancellorship of the University. This post he held for three years from 1912, and it was an exceptional compliment to him on the part of the Senate to grant a tenure of office for three years. We have received from one who was admitted to a special degree of intimacy with Herringham during this period the following tribute to his work:

"The two epithets that spring to my mind as specially characteristic of him in that capacity are 'masterful' and 'greathearted' (μεγαλόψυχος). To which I may add a third Aristotelian virtue—versatility. These qualities, which were his in an exceptional degree, gave him the ability to control the Senate to their own frank enjoyment and to the speedy transaction of the complicated and frequently controversial business with which they were habitually confronted. Although this body contained a considerable number of experts in various branches of academic attainment, some of whom moreover were not wholly in agreement with their immediate colleagues, not to speak of inevitable inter-collegiate difference, no one ever appeared to resent Herringham's handling of the situation—all recognised that their corporate choice had fallen upon the right man, and that his essential authority lay not in his office but in himself. His swift and orderly intelligence perceived at once the value and bearing of any suggestion that might however unexpectedly be sprung upon the meeting, both in its immediate application and (what is of wider and more vital consequence) in its relations to the other aspects and interests of the university; and his judgment was never, as far as I can remember, at fault. He had moreover in an especial degree the divine gift of humour, which never deserted him or offended those upon whom it was directed."

In 1913 Herringham had a notable opportunity for displaying similar powers of organisation when he was elected honorary general secretary to the International Medical Congress held in London in 1913 under the presidency of Sir Thomas Barlow. Any who can recall the conduct of the business arising out of that remarkable gathering of the nations will remember Herringham's careful but almost comically informal method of dealing with it. With various assistants round him he saw everyone who needed counsel, attended to all questions with promptitude, always apparently knowing at once to which of his assistants he could look for an exact reply. He could delegate as well as advise. He was precise in any instructions which he gave with regard to the delivery of contributions, and quite stern, even when he appeared to be flippant, with those who defaulted without adequate excuse from supplying promised assistance. The congress, to which notable contributions came from distinguished colleagues in

many lands, was a great success and Herringham received a knighthood which was fully earned.

The following year war broke out and Herringham went to France immediately as consultant physician to the forces overseas. He was already lieutenant-colonel commanding the medical unit of the University of London O.T.C., so that his qualities as physician were supported by complete familiarity with military routine. He did distinguished work as a consultant and it is noted in the "Official History of the War" that with J. W. McNee he reported the first case of relapsing fever where the initial period of pyrexia was shorter and the relapses more frequent and severe. This case led to investigations as to what type of fever was presenting itself, but during the early part of the war none of the exhaustion sequelæ of trench fever were observed, as the many observations were individual, and it was not until 1917 that the Trench Fever Committee was appointed. Herringham was also largely responsible for the sending in to the No. 3 mobile laboratory the notes and specimens which later were represented in a summary of the chief findings in a series of cases of war nephritis, collected by Shaw Dunn and later published in the reports of the Medical Research Committee and the *British Medical Journal*. Herringham recorded his general war experiences in a volume entitled "A Physician in France." This book appealed to a wide circle of readers and brought home to the lay public the important part played by the medical service in an army at war. The book appeared within a year of the cessation of hostilities and supplied information of great public value. He commented on many questions, social, political, and economic, and his criticisms and reflections were throughout relieved by his friendly humour. The work was timely as it defended the Royal Army Medical Corps effectively from much carping detraction which had been put forward by the ill-informed. In noting the advance in medicine during the war, he brought out the romance of scientific investigation as well as the value of organised research, and Herringham's lessons here are equally applicable to the conditions of peace or war. He was appointed C.B. (Military) in 1915, was promoted major-general A.M.S., and received the K.C.M.G. at the close of hostilities.

The nursing profession owes a large debt to Herringham. The General Nursing Council for England and Wales was appointed by the Minister of Health and held its first meeting on May 11th, 1920, and was therefore still in its infancy in February, 1922, when he was asked by the Minister to assume the office of chairman. We owe to Miss E. M. Musson, LL.D., chairman of the Council, this tribute of his work in the chair: "The Council was in 1922 passing through a crisis and it was primarily due to Sir Wilmot's knowledge of committee work and to his determination and prompt action that it became possible to continue. He spent unlimited time probing into every detail of office work and obtained an independent and expert opinion on the organisation with the result that additional staff and more equipment were obtained to cope with the tremendous rush of applications for registration as well as with the work of committees. He not only attended the meetings of council and of all committees, which then met weekly, but spent many hours at the office dealing with the numerous problems inseparable from such a great undertaking. His first concern was to arrange for the election of a new council—the preliminary to which was the formation of the electorate by publication of the first Register in July, 1922. The first elected council met in February, 1923, Sir Wilmot being unanimously elected chairman, a position to which he was re-elected in 1924 and again in 1925. From the first he maintained that it was due to the dignity of a profession that the chair should be held as soon as possible by a member of that profession and that before the end of the first elected council, elected for five years, the chair should be occupied by a registered nurse. In 1926 he therefore declined nomination, but, at my urgent request, kindly consented to be nominated for the newly created post of vice-chairman, and for the two years during which he remained on the Council he gave me unstinted help and advice whenever I appealed to him. Sir Wilmot's experience in the examination work of a university and the help he was able to obtain for the Council from the University of London were invaluable in the drawing up of the rules and regulations for the conduct of the State examinations and their organisation, as were also his guidance, and that of Sir Jenner Verrall, in legal matters or those where disciplinary situations arose. The financial side of the work always received Sir Wilmot's careful consideration, and he was proud that he left the Council in a sound position in that respect."

At the Royal College of Physicians of London Herringham was a prominent figure. Early appointed an examiner, he became a member of the council in 1908 and served as senior censor. He represented the College on the Senate of the University of London for eight years and was Harveian orator in 1929. His Harveian oration, a fluent delivery without a manuscript, was completely different from all of those exercises. He took it for granted that his audience knew of the researches derived from experiment which had led Harvey to his great discovery, and that the bearings of that discovery on all subsequent medicine must be equally evident to them. He turned to the question of what were the family influences and social environment that accompanied Harvey's work and ministered to its accomplishment, and gave a graphic picture of the family life of the great philosopher. In this oration, an expanded edition of which was published in THE LANCET (Nov. 2nd, 1929, p. 911), Herringham displayed his deep and learned interest in late mediæval culture. This was an aspect of history on which he was singularly well informed. He read steadily to the end of his life history, especially French and English, from the time of Harvey until the beginning of the last century, and acquired a store of minute information on the science, art, religious movements, and general politics of the whole period, carrying apparently in his head the reactions of things as they occurred and their influence on the times that followed up till to-day.

Herringham was a member of the University Grants Committee from 1919, the year of the institution of the Committee, until 1932. He took from the first an important part in advising the Committee as to the needs of medical education, and his wide knowledge of the subject enabled him to give real impulse to the movement for the clinical unit system in the London medical schools. He worked in close association with the officiate throughout, and rendered high service from his technical knowledge, contributing also through his warm-hearted personality to the success of the periodical visits paid by the Committee to the university institutions.

Sir Wilmot Herringham married as a young man Christiana, daughter of Mr. T. W. Powell, of Piccard's Rough, Guildford. She was a highly accomplished painter both in tempera and water-colour, a scholar,

and learned in the arts she practised. Their only son was killed in the war, and Lady Herringham was an invalid for several years before her death in 1929. Towards the close of his life he sought consolation and pleasure from his historical studies and the practice of water-colour painting, of which he became an able exponent. An example of his skill appears in the Royal Academy exhibition this year, a drawing of Llanthony Abbey.

Dr. C. M. Wilson writes: "It is, I think, remarkable that in an age of journalism the death of so unusual a man as Herringham should pass almost unrecorded. Successful physicians are common, but good chairmen are rare, and many bodies profited by the fact that his days were not taken up in practice, for Herringham was born to preside over men. It was not a rôle for which he appeared to be cut out. Many would have predicted that he would have been impatient, intolerant, and even aggressive. They would have been very wide of the mark. He believed it was his duty as chairman to sink his own personality. This masterful man with strong opinions on almost everything appeared to have none as he sat there on the bench sifting the evidence. He had always mastered the subject under discussion, and his judgment was seldom at fault; besides he had the chairman's final gift—courage, for he was quite without fear. In the years of his prime it was no doubt this wisdom in council that set him apart from his fellows, and yet strong administrators with vision are common enough. What was unusual was that the man who possessed this gift was a scholar whose life was ruled by a passion for beauty.

"He had an insatiable thirst 'to learn something new and to see something beautiful,' and he had leisure after the war to feed these desires. He went through the countryside whenever he could in a small car—out of which, owing to his rheumatism, he was extracted with difficulty—perhaps to some Oxford or Cambridge college to read an old manuscript play, perhaps to see spring in the fields (for he was a countryman) or an old picture, or some ancient church. He would put some oatcake and a flask of whisky in his haversack along with painting things and start off after breakfast. His painting was not all plain sailing. 'I am doing it very badly. The greens puzzle me and they are not made any better by the continually shifting shadows from the clouds. I love the sunlight on a green hill and all the lines running down the face of it, showing the different slopes, are lovely too.'

"He had mellowed and was content to accept what fate had brought: not that there was much virtue in that, he would add, since it had laid his life in pleasant places under the shadow of old walls—Winchester, Oxford, and St. Bartholomew's, that great school of medicine which for more than forty years had been the centre of his life. It was as natural for him to turn to the past for an explanation of the present as it is to a lawyer to turn to precedents. And in the interpretation of history he sometimes found a key in his knowledge of the arts. He had been looking at some Dutch pictures, scenes of jollity: 'It looks,' he wrote, 'as if Calvinism which was as rabid in Holland as anywhere did not have much effect on popular life.' But when he tried to apply the same test to England, he found nothing but Herrick's Hesperides, which was about as foreign to Puritanism as anything could well be. When he was in the 'seventies he taught himself Spanish so that he might read Don Quixote in the original. He spoke French like his own tongue, and could quote his Dante when it was apt and native to the occasion. But his most intimate friends were the Greeks, whom he read and re-read every day of his life until they were part of him, just as our forbears lived with their Bibles. Herringham did not exist in a land of memories, he lived in the present. Age kept at arm's length from the formidable old man, and it was only a few months before his death that he handed over his fishing tackle to my son. He grew rather lame, a little deaf, but his mind remained supple and his memory was never touched by time. When he was nearly eighty he thought he ought perhaps to retire in favour of a younger man as chairman of Bedford College, but they would not hear of it for the reason that he was so supremely efficient. To the very end Herringham enriched the lives of those who knew him."

HENRY JASPER CARDALE, M.B. Edin.

Dr. Henry Cardale, who died at his home in Cubitt Town, on April 22nd, in his sixty-sixth year, was the son of the late Vice-Admiral Charles S. Cardale, and was born at Alverstoke, Hants. He was educated at Kingsley College, Westward Ho! and at Sherborne. He studied medicine at Edinburgh University, winning distinction in many subjects, and graduated in 1895, afterwards holding resident appointments at the Royal Albert Hospital, Devonport, and Fisherton House Asylum, Salisbury. He started in general practice at Harrow, but in 1902 he moved to the Isle of Dogs and remained there throughout his life. He became an assistant medical officer of the Education Department, and a district medical officer under the L.C.C. hospitals and medical services committee. He was medical officer to a number of societies and insurance companies, police surgeon of the K and Thames Divisions, medical referee of the Ministry of Pensions, and from time to time acted as a regional medical officer of the Ministry of Health. During the war he was responsible for the medical service of the Inland Water Transport when it was stationed in the dock area, and he rendered service on war pensions under the British Red Cross Society. All this in addition to the grinding toil of a busy private and insurance practice.

DR. CARDALE

[Photograph by Elliott & Fry

The practice which the National Health Insurance Acts brought him Dr. Cardale abundantly repaid by services freely rendered to the administration of medical benefit. He was one of the original members of the London panel committee and became its chairman in 1914, remaining in that office until his death. He was a member of the Insurance Acts Committee, and in 1930 and 1931 was chairman of the annual panel conference. In 1921 he became

a member of the London insurance committee, serving both on the committee itself and on various of its subcommittees. In March, 1925, he was appointed one of the medical members of the London medical service subcommittee, and his interest in its work may be gauged by the fact that, out of a possible 243 meetings held during the period of his membership, he attended no less than 226. A man of strong opinions, Dr. Cardale was sometimes regarded as intolerant of opposition, but those who knew him best realised that it was an honest conviction of the rightness of his own views which made him seem unappreciative of the viewpoint of others. For this reason he was more effective as a fighter than as a negotiator, although in either capacity he had the happy knack of friendliness. A born raconteur, he could often reduce to helpless laughter his opponents of a few minutes earlier. His passing removes one of the few people who have completely mastered the insurance acts and regulations.

THE LATE SIR HAMILTON BALLANCE

WE have received the following tributes to Sir Hamilton Ballance as a surgeon in supplement of the notice published last week. In that notice the statement that Sir Hamilton was originally in general practice was not correct.

Mr. A. J. Blaxland, surgeon to the Norfolk and Norwich Hospital, writes: "Ballance was wholeheartedly devoted to his profession, and even his hobbies of carpentering and deep-sea fishing had an indirect bearing on the perfection of his surgical technique. His enthusiasm for and untiring devotion to his work were a constant source of inspiration and encouragement to his colleagues, and they would all gratefully acknowledge the debt they owe to his example. Those of us who have had the privilege of being his house surgeons and also all his surgical colleagues on the staff of the Norfolk and Norwich Hospital would like to have recorded our deep respect and affection for him as a man, our great admiration for him as a surgeon, and our indebtedness to him for all that we have learnt from him. He was a man of absolute integrity and trustworthiness, and he had a great charm of manner. No one could wish for a better colleague. His chief characteristics as a surgeon were thoroughness and meticulous care, not only in the technique of an operation, but in diagnosis and preparation of a patient and in after-treatment. No time or trouble was too great for him if it were at all likely to add to the comfort or benefit of a patient." Mr. Blaxland adds that not content with being a pioneer in surgery in Norwich he devoted a large proportion of his time to the interests of the profession through official work with the B.M.A. where his high ethical standard proved invaluable.

Dr. A. J. Cleveland, senior physician to the Norfolk and Norwich Hospital, writes: "Ballance came to the hospital at a time when surgical technique was making great advances; the antiseptic method was being supplanted by the aseptic; pathological investigations were becoming a part of clinical surgery; and X rays opened a new field of diagnosis. No man was better equipped for the introduction of the new methods than Ballance, and in conjunction with his colleague Dr. S. H. Long he took up the task with enthusiasm. Extremely painstaking and possessing great powers of application, his work was marked by thoroughness and a conscientious attention to detail. For his clinical judgments he relied on wide study of surgery and powers of sound deduction rather than on intuition, and these, added to a personality which inspired confidence, soon gave him a high place in his profession. He was unselfishly devoted to the interests of the Norfolk and Norwich Hospital, and all his life took a prominent part in its administration, bringing to the task the same qualities of sound and restrained judgment which marked his surgical work. After close association with him for 30 years it is difficult to express an opinion of the surgeon and the man which is not biased by the affection felt for a friend. But that he deserved the recognition he received and that he was in every way worthy of the position in his profession to which he attained, no one who knew him and his work would question for a moment."

THE LATE DR. HAMBLIN SMITH

W. N. E. writes: It was on account of the increasing importance of the medical work at Birmingham prison that it was decided in 1920 to send a medical officer there with special knowledge of mental diseases, and Hamblin Smith was the natural selection for the post. His ripe experience, clinical acumen, and sound judgment were invaluable assets in the daily work of a prison, and enabled him to determine with accuracy the mental states of the trial prisoners under his care. His opinion in the difficult and intricate problems connected with criminal responsibility was relied upon in the courts and by the Prison Commissioners, and his concise and complete reports were models of what a medico-legal report should be. He had not only the prisoners from the Birmingham area but also those sent from outlying prisons for medical observation, and he visited adjacent prisons to confer with their medical officers in capital cases. He was a loyal colleague and in all his work combined charity to the frailties of his patients with jealousy for the reputation of the service. An omnivorous reader of philosophy and speculative psychology, he maintained a clear distinction between assumptions and facts and his theoretical inclinations never obtruded on his daily duties. It was this scientific outlook tempered with common sense that captured and retained the confidence of the courts he worked in.

DR. WALTER SIRR SHELDON, whose death occurred on April 15th, was educated at St. Paul's School and went for his medical training to University College Hospital where he was junior and senior Fellowes medallist in clinical medicine. He took the English double qualification in 1898 and filled the resident posts of house physician and house surgeon and obstetric assistant. He was also for a time clinical assistant at the Royal London Ophthalmic Hospital. During the war with the rank of temporary captain, R.A.M.C., he served in the Ypres and Etaples centres. He practised in the Bayswater district of London for many years, in succession to his father, the late Dr. Thomas Sheldon.

DR. HARRY MASON, who died on April 23rd from pneumonia after a short illness, was 59 years of age and had been county medical officer for the North Riding of Yorkshire since 1924. He qualified at Edinburgh in 1900 and, after demonstrating both in anatomy and pathology, began to practise in

(*Continued at foot of next page*)

CORRESPONDENCE

TREATMENT OF PHLEBITIS IN VARICOSE VEINS

To the Editor of THE LANCET

SIR,—The article by Dr. Biegeleisen in your last issue calls for certain comments. Firstly, it contains many statements of fact with which I find myself in complete disagreement ; and secondly, the treatment of phlebitis by means of sclerosing injections during the active phase of the disease is diametrically opposed to current teaching in this country.

Dr. Biegeleisen opens by saying : "The conservative treatment of phlebitis in varicose veins has proved unsatisfactory and the purpose of this paper is to present a new method of treating this rebellious disorder, which so often terminates in a permanently damaged extremity." Does clinical experience support this ? The statement is also made that phlebitis in varicose veins differs from "ordinary phlebitis" in being subacute or chronic. Actually this so-called ordinary phlebitis is so rare as to provide no real comparison.

After characterising the existing treatment of phlebitis as "confused and timid," Dr. Biegeleisen makes the following statements : "(1) phlebitis in varicose veins rarely heals spontaneously ; (2) the danger of embolism is greater in the untreated cases ; (3) temporising means permanent lymphatic and tissue damage ; and (4) sclerosing injections can safely occlude the dilated infected vessels." My own experience leads me to believe that the so-called phlebitis in varicose veins invariably subsides with conservative treatment, and in many cases does so almost irrespective of the treatment. As regards the danger of emboli, I feel sure an unnecessary bogy has been made of this. Statistics on the point are difficult to obtain but personally I have yet to see a fatal or a non-fatal pulmonary embolus following spontaneous phlebitis in varicose veins. Emboli certainly do occur from time to time, but patients with this complication are rarely seen in the out-patient departments, in the wards, or in the post-mortem room. The argument that conservative treatment of phlebitis leads to permanent lymphatic and tissue damage is only true of the very small group of cases in which the phlebitis really becomes subacute or chronic.

Dr. Biegeleisen states he has carried out immediate sclerosis in a series of 300 cases of phlebitis with good results. As a guide to the infective element in the phlebitis he uses the sedimentation-rate of the blood, and on the basis of his figures divides his cases into four groups, those with active infection and those with probable absence of infection as extremes. This very elaborate investigation is followed by injection treatment which has to be gauged very carefully to avoid the "flare-ups" which he admits occur after the injection of phlebitic veins. I think, however, the clue to Dr. Biegeliesen's article is to be found in the legend accompanying Fig. 1, which reads : "Phlebitic varicose veins : no tenderness, thrombosis, or hyperthermia. Varicose ulcer present. Sedimentation-rate 20 minutes." If the word phlebitis is capable of being used for a process in which tenderness, thrombosis, and hyperthermia are not present, then it has become too loose in its meaning to have any clinical application. It would appear that he is using the word in a sense other than the accepted one, and that many of his cases are really ones in which old, quiescent, and clinically hard and painless mural thrombi are palpable in varicose veins. Dr. Biegeleisen makes so many statements which are frankly contrary to my own experience, and his use of the word "phlebitis" seems to be so unusual that I must hesitate to accept his arguments in favour of immediate injection treatment in cases of phlebitis. The subject of phlebitis in varicose veins is a thorny one in relation to nomenclature, and the word may be used to cover anything from a thrombosis to a frankly suppurative process. Injection treatment of the type of case he deals with may be safe, but the most acute "flare-ups" I have ever been called to see have followed injection of veins recently the site of phlebitis. In addition to this some at least of the recorded cases of fatal pulmonary emboli have occurred when injections were carried out shortly after an attack of phlebitis.

The conservative treatment of phlebitis is satisfactory in almost all cases of the acute, subacute, and chronic disease. A few cases in all of these groups necessitate surgical treatment, but they are exceptional ; the remainder are safely and efficiently dealt with by injections after the phlebitis has subsided. The interval of six months which I observe in these cases is purely arbitrary, but its observance has at least avoided any complications even where the antecedent phlebitis has been of the most acute type.—I am, Sir, yours faithfully,

Harley-street, W., April 25th. REGINALD T. PAYNE.

VARICOSE VEIN INJECTIONS

To the Editor of THE LANCET

SIR,—I have read with interest Mr. Bennett-Jones's observations in your issue of March 7th (p. 537) on the empty vein technique for the injection treatment of varicose veins. He stresses what I preach in season and out, particularly in "The Cure of Hæmorrhoids and Varicose Veins" (London, 1934). If all injectors would use this method one would not encounter so many of other people's failures. That technique leads to smaller clots, a quicker cure, and less after-pain for the patient. Certainly the tourniquet is to be recommended as a routine measure, but in expert hands, particularly when great numbers have to be dealt with by team-work at a clinic, there are two quick "dodges" that obviate a tourniquet :

(1) Stand the patient on a stool alongside the operating couch. Place one's left thumb over the vein. Quickly lay the patient on the couch, pierce the vein with the needle, release the thumb, make sure that the needle is in the vein, and inject ; or

(2) With the patient standing with a full vein and no

(*Continued from previous page*)

Barnsley. Having taken the D.P.H. Leeds he entered the public service as medical inspector of schools in the West Riding, later moving to the North Riding, but never leaving the county of his birth. He was an administrative officer of considerable breadth of view whose devotion to the public welfare made him widely beloved. One of his colleagues writes that his fellow workers found him courteous and kind, always determined to make their way easy for them.

tourniquet, pierce the full vein with a needle. Let it bleed a drop or two, catching the drops on wool. Gently lay the patient down backwards on the couch, affix the syringe to the needle (which is now in an empty vein), draw blood into the syringe (to make sure the needle is still in the vein), and inject.

The tourniquet moreover is unpleasant for nervous patients, especially when pumped up to the arbitrary level of 180 mm. Hg. These "dodges" also save time.

I note that Mr. Bennett-Jones uses exclusively sodium salicylate 30 per cent. Sicard's work was done exclusively with this. But, from long experience with various sclerosing fluids, I have come to the conclusion that different fluids are indicated in different types of veins and also in different types of patients. I largely use lithium salicylate 35 per cent. with 1 per cent. Ethocaine (an injection fluid we owe to R. Maingot), which has all the advantages of sodium salicylate and none of its disadvantages. It has however one drawback that I recently pointed out (Brit. Med. Jour., 1935, ii., 229)—viz., that clots seem to get bigger even ten weeks after an injection and lead occasionally to ulcers many weeks later. Therefore I avoid this fluid in superficially placed or thin-walled veins. Quinine is, I think, the most constant fluid to be effective; but patients do not like its associated momentary flushing of the face, buzzing head, and palpitation. Sodium morrhuate is most useful for small superficial veins, and its froth for skin venules. But it has its dangers in susceptible people (see Brit. Med. Jour., 1933, i., 430, 674).

I would commend to Mr. Bennett-Jones the value of firm pressure over a large strip of the vein, for three days subsequent to its injection, of a firm wad of wool held in position by Elastoplast. In this way one secures smaller clots, a greater likelihood of occlusion, and, I am convinced, less chance of ultimate recanalisation.

I am, Sir, yours faithfully,

Liverpool, April 21st. STUART MCAUSLAND.

GASTRIC ACIDITY AND ITS SIGNIFICANCE

To the Editor of THE LANCET

SIR,—In an article under this title in your issue of Jan. 4th Prof. F. L. Apperly states that it was he who with Crabtree showed in 1931 that the CO_2 content of the fasting blood plasma governed the acidity of the gastric contents after a test-meal in any one individual, and that the CO_2 content of the plasma was responsible for the differences in gastric acidity existing between different individuals. I wish to call attention to the fact that this observation was made and described first by me (Klin. Woch., 1924, iii., 1951), and that I subsequently enlarged on this subject in several other publications (A New Approach to Dietetic Therapy, Metabolism of Water and Minerals and Its Disturbances, Boston, 1933, &c.). I showed, in addition, that in reality it is the concentration of all the acid substances in the blood rather than that of CO_2 alone that, in accordance with the rules of physicochemistry, influences the concentration of hydrochloric acid in the gastric cavity. The acid substance of the blood which is quantitatively most important is CO_2 and since the variations in the concentration of this acid are the most common occurrences, in most (but not all) cases a parallel behaviour might be found between its concentration in the blood and the gastric acidity.

In addition to the concentration of the acid substances in the blood I showed that there is another factor that influences the concentration of hydrochloric acid in the gastric cavity. This is the permeability of the membrane formed by those cells of the mucosa of the fundus of the stomach in which the production of hydrochloric acid takes place. If the permeability of this membrane decreases, as may occur as a consequence of a chronic gastritis, a low hydrochloric acid concentration or, in other words, a hypochlorhydria or achlorhydria may be found, notwithstanding the presence of a high CO_2 concentration in the blood or, generally speaking, in spite of a "hyperacidemia." (This relationship is similar to the association of a high urea-nitrogen content in the blood with a low urea-nitrogen content in the urine as a consequence of decreased permeability of kidney cells in chronic glomerulonephritis.) The existence of a chronic gastritis and the consecutive decrease in the permeability of the gastric mucosa would explain the seeming contradiction (to which Dr. Hurst calls attention in your issue of Jan. 18th, p. 168) that notwithstanding there is a high CO_2 content of the blood the hyperchlorhydria postulated by Apperly is absent in bronchial asthma.

Another statement made by Apperly is that "there is a direct relationship between the red cell content of the blood and gastric acidity." This observation also was first published by me in the year 1924 (Zeits. f. d. ges. exper. Med., 1924, xli., 342, &c.). I described my findings in a statement that the higher the percentual volume of the red blood-cells in the whole blood ("hematocrit value") the higher the gastric acidity. The existence of this relationship was explained by the observation that both the hæmatocrit figure and the gastric acidity are governed by the concentration of the acid substances in the blood. Mention should be made, however, that the behaviour of the red blood-cells is identical with that of acid substances in the blood, so that not only are these former influenced by the concentration of the latter, but that the red blood-cells in their turn influence the concentration of the acid substances in the blood, hence influence the gastric acidity as well. Consequently, a hypochlorhydria or achlorhydria may follow if there is a decrease in the red blood-cell content of the blood, an occurrence which I described in 1924 as "hematogenous hypochlorhydria or achlorhydria" (ibid., 1924, xliii., 247) and to which Apperly's anæmic achlorhydria corresponds.

It would appear, therefore, that Hurst goes too far in his contention that the red blood-cells do not influence the gastric acidity. In the production of the hydrochloric acid concentration in the stomach, however, consideration must not be given to the presence and physiological significance of only one acid substance, such as the erythrocytes, but to the concentration of all the acid substances. Thus the acids of the blood represented by the red blood-cells may be decreased on account of anæmia and yet the sum total of all the acids may be normal or higher than normal. This would explain the observation that anæmia may exist without achlorhydria or with normal hydrochloric acid concentration or even with hyperchlorhydria, the existence of such cases contradicting, as pointed out by Hurst, the assertion of Apperly that, when the red blood-cell content of the blood falls to about one-half or two-thirds normal, free acid disappears from the stomach.

I am, Sir, yours faithfully,

New York City, March 14th. EUGENE FÖLDES.

PROPHYLACTIC ENUCLEATION OF LOWER WISDOM TOOTH FOLLICLES

To the Editor of THE LANCET

SIR,—I am sure that the medical profession as a whole will be grateful to Mr. Bowdler Henry for bringing forward such an easy and entirely satisfactory procedure to cope with what is often a menace—namely, a badly impacted unerupted lower molar tooth. By such a prophylactic measure as Mr. Henry has introduced, all the numerous risks which are attendant upon maleruption are eliminated. Surgeons are familiar with some of the complications which follow the extraction of a badly unerupted third molar and it has been my lot to be called into consultation several times when fracture of the jaw has resulted from attempts to remove such a tooth. I can vouch that prophylactic enucleation is entirely free from trauma, and is quite a simple operation; one only wonders why such an easy remedy had not been thought of years ago.

I am, Sir, yours faithfully,

CECIL P. G. WAKELEY.

Queen Anne-street, W., April 22nd.

PURPURA HÆMORRHAGICA FOLLOWING MEASLES

To the Editor of THE LANCET

SIR,—Your last issue contained an account of purpura complicating scarlet fever, and it may be of interest to put on record a case in which it followed measles.

A girl, aged 4, was admitted to this hospital on April 8th, with the provisional diagnosis of "black measles." It appeared that she had a measles rash on March 29th; on April 7th she came out with a hæmorrhagic rash and passed blood in the fæces and urine. She had widespread petechial and purpuric hæmorrhages all over the body and sordes of coagulated blood. The hands were a deep dark blue, the face pale and the child obviously poorly. Temp., 99° F.; pulse-rate, 120. She was given 20 c.cm. of whole blood from her father, as well as glucose and saline intramuscularly. Both punctures bled very freely, but curiously when 20 c.cm. of scarlatinal antitoxin was given, also intramuscularly, the puncture did not bleed. She passed a dark tarry stool; the urine was bright red with blood. Blood-platelets numbered 35,000 per c.mm.; otherwise there was nothing strikingly abnormal in the blood. Prof. J. F. Wilkinson was consulted and advised intensive vitamin-C therapy, both oral and hypodermic; ascorbic acid was used, and in addition eight lemons were given daily. She continued to pass blood until April 15th, when both fæces and urine were clear. The skin gradually cleared, but peeled profusely and serum continued to ooze in places. She is making good progress towards complete recovery. On April 24th the blood-platelets were up to 100,000 per c.mm., and the general condition has improved considerably.

I am, Sir, yours faithfully,

W. EDGE,

Medical Superintendent, Ladywell Sanatorium and Isolation Hospital, Salford.

April 27th.

OMNIPRATICIENS

To the Editor of THE LANCET

SIR,—I have just observed that in a circular emanating from the publishers of a medical book in Paris they state that "Tous les médecins (omnipraticiens et spécialistes) doivent avoir ce petit volume sur leur bureau." The word "omnipraticiens" is new to me, and I suppose is nearer akin to the English "general practitioner" than was the old expression "médecin praticien." I have no knowledge of how far the new word is generally used in France, but it is certainly compact if it means "general practitioner" as in English, and it may be quite useful to our own doctors visiting France if they wish to describe their position concisely in modern language.—I am, Sir, yours faithfully,

London, April 24th. BLANCUS.

PUBLIC HEALTH

Revised Milk Designations

THE Milk (Special Designations) Order, 1936, was made available last Saturday and will come into force on June 1st. It supersedes the two draft orders which have been issued and lays down the new system of milk grading.

The grades at present in force are:—

Certified
Grade A (tuberculin tested)
Grade A
[Grade A (pasteurised)]
Pasteurised.

There is no necessity for producers to conform to the standards established for these grades, and most milk sold to the public is undesignated. The new regulations make no change in this policy: they do not require that all milk shall be graded. Instead they continue the plan by which designations are given as a mark of commendation for efforts to reach a better standard.

The new scheme is simpler than the old, and essentially there are only three grades:—

Tuberculin-tested
Accredited
Pasteurised.

Additional descriptions may, however, be added by producers who are suitably qualified. If tuberculin-tested milk has been bottled on the farm—like the present Certified milk—it may be described as tuberculin-tested (certified); if it has been pasteurised it will be called tuberculin-tested (pasteurised). Furthermore accredited milk may be described as "farm bottled." Hence the varieties available to the public (not necessarily in order of merit) will be—

Tuberculin-tested (certified)
Tuberculin-tested (pasteurised)
Tuberculin-tested
Accredited (farm bottled)
Accredited
Pasteurised

and, of course, undesignated milk.

It will be observed that all tuberculin-tested milk will now be described as such—whether or not the term "certified" is applied in addition. The old requirements were that certified milk should contain not more than 30,000 bacteria per c.cm. and Grade A (T.T.) not more than 200,000; and until the end of this year the latter standard will hold good for the new T.T. grade. After that time the bacterial plate-count will be discontinued in favour of a methylene-blue reduction test (see THE LANCET, April 11th, p. 866). In addition, no coliform bacilli should be found in 0·01 millilitre—a requirement similar to that for Grade A (T.T.). Tuberculin-

tested milk (pasteurised) must contain less than 30,000 organisms per millilitre.

Accredited milk corresponds closely with the present Grade A. To qualify under the Milk Marketing Board's scheme, the accredited herds, like the Grade A herds, undergo routine examination by veterinary surgeons every three months, and the milk they yield will have to pass the same methylene-blue test as the T.T. milk. The cows, however, are not tested with tuberculin.

The regulations governing pasteurised milk are not substantially altered from those of 13 years ago, except that temperature records must be made and kept for not less than a month. It must contain fewer than 100,000 organisms per millilitre at any time before delivery to the consumer. The licensing authority for pasteurising establishments is, as before, the local sanitary authority (i.e., the council of a borough—including a metropolitan borough—or of an urban or rural district). But licences to producers of tuberculin-tested milk will in future be granted by the councils of counties and county boroughs and not directly by the Ministry of Health.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 18TH, 1936

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1858; diphtheria, 892; enteric fever, 29; pneumonia (primary or influenzal), 897; puerperal fever, 27; puerperal pyrexia, 103; cerebro-spinal fever, 25; acute poliomyelitis, 2; acute polio-encephalitis, 1; encephalitis lethargica, 5; dysentery, 45; ophthalmia neonatorum, 93. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 24th was 6528, which included: Scarlet fever, 972; diphtheria, 904; measles, 3335; whooping-cough, 560; puerperal fever, 10 mothers (plus 6 babies); encephalitis lethargica, 282; poliomyelitis, 5. At St. Margaret's Hospital there were 24 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 102 (46) from measles, 6 (2) from scarlet fever, 42 (11) from whooping-cough, 26 (6) from diphtheria, 51 (26) from diarrhœa and enteritis under two years, and 52 (5) from influenza. The figures in parentheses are those for London itself.

Measles remains the most fatal infectious malady of the period, the number of deaths for the last eight weeks working backwards being 102, 103, 81, 104, 114, 105, 84, 88 for the country as a whole, and 68, 60, 43, 62, 62, 58, 47, 38 for Greater London. Birmingham reported 4 deaths, Barking, Leyton, Southampton, Bradford, Liverpool, and Manchester each 3, no other great town more than 2. Birmingham also reported 4 deaths from whooping-cough, Liverpool, Manchester, and Wigan each 3. Deaths from diphtheria were reported from 16 great towns, no more than 2 from any one of them.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 44 per 1000 total births), including 41 in London.

A FESTSCHRIFT FOR DR. LAMBOTTE.—In recognition of his contributions to surgery, the friends, pupils, and patients of Dr. Albin Lambotte, of Antwerp, have decided to publish a jubilee book in his honour. The value of his work in bone surgery particularly in the open reduction of fractures and their fixation by metal prostheses, has had world-wide acknowledgment, and it is fitting that the book also should be international in its scope. Among the more than fifty contributors will be Albee, Fairbank, Hey-Groves, Leriche, Putti, Sauerbruch, Smith-Petersen, and Steindler. The work will be devoted to the surgery of bones and joints, and particulars may be had from Dr. Jean Verbrugge, 75, Avenue Van Ryswyck Antwerp, Belgium.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. T. J. O'Riordan to *Royal Sovereign*; L. F. Strugnell to *Pembroke* for R.N.B.; H. H. Babington to *President* for R.N. Recruiting Headquarters; and E. L. Markham, O.B.E., to *Pembroke* for R.N.B.

Surg. Lt.-Comdrs. S. J. Savage to *Drake* for R.N. Hosp., Plymouth; and D. C. Drake to *Guardian*.

Surg. Lt.-Comdrs. (D) A. A. Gardner to Greenwich; H. A. Ginn to *Valiant*; and A. W. Wallace to *Maine*.

Surg. Lts. A. F. Ferguson and H. P. L. Rhodes to *Drake* for R.N.B.; D. N. Williamson to *Victory* for R.N.B.; and J. B. Morris to *Pembroke* for R.N.B.

Surg. Lts. (D) A. W. Y. Price to *Pembroke* for R.M. Infirmary, Deal; and W. C. G. Ford to *Malabar* for R.N. Hosp., Bermuda.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lts. J. E. L. Morris to *Ramillies*; and F. J. S. Gower (proby.) to *Curacoa*.

Surg. Sub-Lt. R. T. Gaunt to be Surg. Lt.

Surg. Sub-Lts. J. Scott to *Pembroke* for R.N. Hosp., Chatham; P. de B. Turtle to *Vernon*; and R. T. May to *Royal Sovereign*.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. W. H. S. Burney, having attained the age for retirement, is placed on ret. pay.

Maj. R. E. Barnsley, M.C., to be Lt.-Col.

Short Service Commissions: Lts. G. S. Musgrove and N. I. McLeod to be Capts.

Maj. B. H. C. Lea-Wilson is secd. for serv. under the Foreign Office.

REGULAR ARMY RESERVE OF OFFICERS

Maj. J. W. Houston, D.S.O., having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ARMY DENTAL CORPS

Short Service Commissions: the undermentioned to be Lts. (on prob.): D. V. Taylor, D. S. Wilson, and R. Walker.

TERRITORIAL ARMY

Capt. J. R. Robertson is restd. to the Estabt.

Lts. A. Cowie and C. K. D. Edwards to be Capts.

Supernumerary for service with O.T.C.: S. M. Whitteridge (late Cadet, Univ. Coll. Sch. Contgt., Jun. Div., O.T.C.) to be Lt. for duty with the Univ. of Lond. Contgt. (Med. Unit), Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. R. M. Allardyce, from Active List, to be Capt.

ROYAL AIR FORCE

Flight Lts. G. W. McAleer to Medical Training Depôt, Halton; C. G. Harold to Central Medical Establishment, London.

Flying Officer F. W. Whitehead to Medical Training Depôt, Halton, on appointment to a short service commission.

W. J. Fowler is granted a short service commission as Flying Officer with effect from Dec. 2nd, 1935.

Flight Lt. R. G. Freeman is promoted to the rank of Squadron Leader.

INDIAN MEDICAL SERVICE

Majs. to be Lt.-Cols.: A. C. Craighead, P. H. S. Smith, and H. J. H. Symons.

Capts. to be Majs.: M. K. Afridi and G. S. Chawla.

Lt. (on prob.) E. H. Wallace is seconded while holding an appt. at the Cumberland Infirmary, Carlisle.

Capt. V. A. Edge retires.

ELIZABETH GARRETT ANDERSON HOSPITAL, LONDON. The accounts for last year show an excess of income over expenditure of £385, and during the past year 2264 patients were admitted. An appeal was made in 1935 for £50,000 for the new nurses' home and private patients' wing.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

The Budget and the Social Services

ON April 22nd the House of Commons went into committee of ways and means on the Budget resolutions.

Mr. PETHICK-LAWRENCE said he doubted whether in peace time any Budget statement so staggering in its future outlook had ever been presented in that House. Was there no prospect that the resources of the nation were to be utilised for the development of the country as a whole? Were they to see an enlightened change in the treatment of the unemployed, and the abandonment of the cruel and indefensible means test? No. The policy of the Chancellor of the Exchequer squandered national prosperity by increasing armaments. The Labour Party, quite as much as their opponents, believed in the defence of the country, but they believed that defence depended on foreign policy.

Sir ARCHIBALD SINCLAIR said that the Liberal Party did not deny the necessity for adequate provision for defence against foreign aggression, but they said that defence problems must be considered as a whole. They urged that the Government should work for peace and economic coöperation between all countries with as much will and energy as they were throwing into their policy of rearmament.

Mr. MINTO RUSSELL said the rearmament programme was an insurance premium which had got to be paid; there were other fields in which the national expenditure could be drastically cut down. He suggested the setting up again of a committee on the lines of the May Committee to investigate how this could be done. He asked the Chancellor to consider the advisability of broadening the basis of direct taxation. There were at the last election some 31,000,000 electors, and only 3,000,000 direct taxpayers. He saw the gravest danger of certain sections of the electorate voting to themselves, either consciously or subconsciously, benefits and amenities at the expense of other sections. To lower the basis of direct taxation would help to bring into clearer relief the correlation between cause and effect. Unless there was some greater control over finance, the country would find itself again going down the slippery slope.

Mr. BENSON said that in spite of the tremendous growth of the wealth of the country, there was the shameful fact that 50 per cent. of the population still showed signs of malnutrition. In this Budget the Chancellor had thrown a still greater burden on the indirect taxpayer, who was primarily the small man. Of the proposed increase of £64,000,000 in expenditure, a bare £3,000,000 was allocated for the distressed areas. Apparently he did not anticipate any more social legislation for the next 12 months. He had made no allowance for the new scales of unemployment benefit.

Mr. M. BEAUMONT said that they could not redistribute wealth through high taxation and social services and through increased wages at the same time. He believed that the latter was the sounder way. They would be foolish if they believed that this increased expenditure on armaments was temporary. The country was now able to carry the burden because it was on the upward grade of a trade cycle. But they were approaching the point where they would not be able to find new sources of revenue with which to meet the national liabilities.

Mr. DAVID ADAMS urged special treatment for the distressed areas. There ought to be specific grants made for each of the social services in order to equalise to some extent the huge disparity in rating burdens.

Mr. R. J. TAYLOR regretted no mention in the Budget speech of the problem of maternal mortality. Those who were going into the Army wanted something to fight for, not surtax payers, but decent comfortable homes.

Sir ISIDORE SALMON said that he did not think a better method could be found of giving the people something in their homes than by finding work for them.

Mr. DALTON suggested that the Chancellor should consider next year whether the surtax limit should not be brought down from £2000 a year to £1500 a year. By that means he estimated they would bring in at least 40,000 more contributors, and bring under taxation at least £70,000,000 more of income each year.

Mr. W. S. MORRISON, Financial Secretary to the Treasury, replying to the debate, claimed that the securing in time of danger of adequate defences for the nation was a true work of national importance which every citizen had an absolute right to see carried out. All other expedients for using the public credit for various purposes of a sectional or local character, important and valuable as those works might be, faded into insignificance when compared with the primary task of seeing that the country had adequate defences which would enable it to play its full part in a policy of collective security and would put us in the last resort in a position, not to be a menace to our neighbours, but, if the idea of force prevailed in the world, to render it a more difficult and dangerous enterprise for anyone to attack us.

THE DEBATE RESUMDED

On April 23rd Mr. MCGOVERN said that during the financial crisis of 1931 large numbers of people were involved in considerable suffering and sacrifice. They were led to believe that those sacrifices were temporary, and that when prosperity returned the Government would make good the losses which the people were being asked to bear. As a result of this so-called crisis social reform seemed to have been relegated to the background, and since 1931 no first-class measure of social reform had been passed in this country. Changes were made by the Act of 1932 that took away the right to maternity benefit from a large number of wives of unemployed men and also took away medical rights. Surely they ought now to annul those extreme measures and give these people the security to which they were entitled.

Mr. CHURCHILL recalled that the Chancellor had referred with pride to the increasing growth of our social services. He shared in that feeling. The social services must not be considered as a weakening of the strength of the nation. He believed that those services had given us that foundation which was essential to national unity and without which it would be hopeless for us to attempt to make headway against the many perils which were moving towards us.

Mr. MORGAN JONES said that the distressed areas had been described as a creeping desert. The people in those areas were as much entitled as any other section of the community to generous consideration.

Mr. ELLIS SMITH said that unless the Government dealt with the means test very soon it would be faced with a similar position to that with which it was faced not very long ago. Throughout the country, particularly in the North, men were being driven to suicide, and domestic friction was being created unnecessarily. He asked for a drastic change in the administration of the means test and the early introduction of new unemployment regulations.

Mr. LYONS said that our social services—the greatest ever known—had continued unimpaired. Something had been said in the debate about the omission of the Budget to deal with maternal mortality, but in a few days the House would consider

a Bill providing, for the first time in this country, for a national system of paid nursing services to expectant mothers. It was no use saying that maternal mortality, deplorable as the figures were, was one of those things which could be related to unemployment. Nobody would deny that unemployment, malnutrition, and bad nursing were factors which had to be provided for, and which he hoped would be provided for when a full account was taken. But they were not all. Whatever might be our duty to the country and to collective security, there was to be no reduction in the social services and no halting in their progress.

Sir ARNOLD WILSON suggested that it was within the power of the Government to get better value for what they were spending. He found from the report of the Charity Commissioners for 1934 that there were 244 charities for blind persons. There were only 63,000 blind persons in England; one society for every 250 persons. That was a waste of money. As many charities were entitled to a rebate of income-tax the Chancellor might reasonably inquire from the Commissioners a certificate that they were efficiently organised, and that there was no overlapping. They would have to get back before long to the minority report which advocated the breaking up of the 6000 independent units of friendly societies and the reconstitution of them on a basis of county and county borough, making the cost of administration far less.

Mr. ARTHUR GREENWOOD said that this was a war budget with no consideration for the social services. The scale on which rearmament had been envisaged by the Government would necessitate an expenditure so large that it could only be met by increased taxation of the rich or by further impoverishing the poor and putting posterity in pawn.

Mr. CHAMBERLAIN, replying to the debate, said this was a Defence budget. He had deliberately put on fresh taxation because he believed that the people of this country ought to feel that they had to pay for the necessities of the situation.

Paying Patients in Voluntary Hospitals

On April 28th Standing Committee B of the House of Commons considered the Voluntary Hospitals (Paying Patients) Bill.

Clause 1, which defines the meaning of the terms "voluntary hospital," "committee of management," and "Order," was agreed to.

Clause 2 provides for accommodation for and charges to paying patients, and subsection (4) enacts that the Charity Commissioners may, from time to time on the application of the committee of management, vary or revoke an Order authorising the provision of such accommodation and treatment if in their opinion there has been any material change in the circumstances existing when the Order was made.

Mr. R. J. DAVIES moved an amendment to provide that the Order might be varied or revoked if for any other reason the Charity Commissioners thought it was expedient. He said that the object of the Bill was the very simple one of removing the legal obstacles that now stood in the way of providing private accommodation in hospitals for persons requiring surgical or other treatment and were able and willing to pay for such treatment. So far, they agreed to the full with that proposal. They had a feeling, however, that in the case of persons who could afford to pay they might, by the Bill, take up accommodation for what might be called members of the middle-class community, and that by doing that—although with the very best intentions and it was necessary it should be done—they might preclude the provision of accommodation for those who required the same treatment, but could not afford to pay at all. The amendment sought to give power to the Charity Commissioners so to vary the Orders that the point he raised would be met. If the promoters of the Bill would accept the idea propounded in the amendment and put down words on the Report stage to meet the case, he would not unduly press the amendment.

Mr. STOREY said that the amendment was based on a misconception. He differed from Mr. Davies in the view that under the Bill accommodation which should be free might be taken up. His experience of hospitals was that the provision of accommodation for paying patients freed the ordinary beds. In a hospital with which he had been very closely connected for many years, they took into the ordinary wards patients who could afford to pay. They provided accommodation for paying patients and thereby freed beds in the ordinary wards because the paying patients went into the paying wards. Clause 4 of the Bill contained a general overriding provision that an Order should not be made if it would result in less accommodation being available. As Clause 2 was now drawn, any material change of circumstances would enable the Charity Commissioners to revoke or vary the Order. That would apply, for instance, if a hospital suddenly had more funds that would enable it to treat ordinary patients, or any other circumstance of that sort.

The point which really weighed with him was that if they were to go out and collect money for paying patients' wards, they must be able to give some security to the persons who provided the money. They would have difficulty in collecting money for such wards if they had to tell the subscribers that the Charity Commissioners could come along and, for any other reason unspecified, change the whole purpose of the trust for which the money was being given. If there were an unexpected demand for ordinary beds, and if a hospital had the ability to finance ordinary beds, that would be a material change of circumstances which would enable the Charity Commissioners to step in; but they ought not to be left with power for any other reason unspecified to vary a trust which had been created for a specific purpose. These Orders would be made for a period, and it would then be possible for them to reconsider the Order if there had been any material change in the circumstances.

Mr. DAVIES said he would withdraw the amendment and consider what should be done on the Report stage.

Mr. STOREY said he would be willing to discuss the matter before the Report stage and if they could agree on some form of words which would give the security required he would be very glad.

Mr. W. A. ROBINSON asked if there was any possibility of the Bill cutting across any existing schemes such as the penny in the £ scheme.

Sir ALAN ANDERSON, as one who had had a great deal to do with the finances of hospitals in London since the war, said that so far from the existence of pay beds reducing the number of beds available for persons who could not pay, it had had exactly the opposite effect. The movement for paying wards was a very great advance in the facilities available for those persons who could not afford to pay.

Mr. FRANK ANDERSON asked if there was anything in the Bill which would safeguard the position of paying patients with regard to doctors' fees. He wanted to be assured that if patients came into this category they would not be subjected automatically to an increase in the doctors' fees. He had a case in mind, which occurred not long ago, where a patient went into a certain institution not far from Manchester. The doctor, in the first place, said that the fee would be two guineas, but when it was found that the person in question was possibly able to pay more, the doctor immediately increased the fee to three guineas.

Sir DONALD SOMERVELL, Attorney-General, said that the Bill was designed solely to provide a convenient procedure whereby certain hospitals could get over legal obstacles which now prevented them

from establishing beds for paying patients. Those hospitals, and there were many of them, which could start paying beds by the terms of the trusts under which they operated, without having to come to Parliament for a private Act, or to take any step of that kind, would be quite unaffected. The Bill was merely designed to provide a convenient procedure in the case of those hospitals which, by reason of a private Act of Parliament, or their original trusts, were not able, without parliamentary sanction, to undertake such a scheme. There was general agreement in the Committee that this was a desirable object. Penny in the £ schemes, or twopenny contribution schemes, which were so valuable an aid to hospital finance, were outside the Bill altogether and had nothing to do with it. The point raised by Mr. Anderson, as to the actual arrangements which particular hospitals might make as to doctors' fees, was also outside the Bill. They could operate with or without the Bill. The whole question of what charges should be made and what charges were proper, was one which affected all the hospitals of the country, and all that the Bill did was to say that those hospitals which could not proceed at present under their own powers, and would have to come to Parliament for a Private Bill could go to the Charity Commissioners and get an Order. It was quite true that that Order would, as part of its terms, deal with the general charges that should be made, and would no doubt follow what seemed to the Charity Commissioners—he thought they could be trusted in this matter—to be a proper and reasonable scale to apply to any scheme they might draw up.

Mr. STOREY, replying to points raised by other members, said that the Bill would ensure that the provision for pay beds would be met out of monies given for the purpose, and that existing funds available under the original trusts would not be used, except in circumstances that would cause no loss of facilities for ordinary patients. Land must not be used unless it would not in any case be used for ordinary beds; existing buildings would not be used unless it was not possible to use them for ordinary patients, or they were not required for ordinary patients owing to lack of demand: or unless the hospital authorities provided additional buildings in exchange. If he thought that the Bill would harm the Penny in the £ scheme he would oppose it. The question of doctors' fees for services from the resident staff was covered in the Bill. If special treatment was required that would be a matter for arrangement between the patient and the doctor concerned.

Mr. ANDERSON said that if a patient had entered an institution and it was found that possibly he could afford to pay more, he should have the right to know whether or not a proper charge was being made on him in accordance with the Order.

Mr. STOREY said that there would be a definite scale of charges laid down for the whole treatment rendered by a hospital and its resident staff. That scale of charges could not cover specialist fees for professional services rendered by visiting surgeons or physicians.

The amendment was withdrawn and the clause was agreed to.

[The remaining clauses were agreed to, and the Bill was ordered to be reported, without amendment, to the House.]

In the House of Commons on Wednesday, April 22nd, Mr. CLEMENT DAVIES presented the Buckingham Charity in Dunstable Bill, a measure "to confirm a scheme of the Charity Commissioners for the application or management of the Charity of Arthur Frederick Buckingham for a cottage hospital in the borough of Dunstable in the county of Bedford." The Bill was read a first time.

On Monday, April 27th, the Bill was read a second time.

HOUSE OF COMMONS

WEDNESDAY, APRIL 22ND

Medical Facilities in Palestine

Captain STRICKLAND asked the Secretary of State for the Colonies whether he was aware of the complaints as to the existing dangerous condition of the road between Jaffa and Haifa, and that on many occasions large communities were completely isolated, unable to market their produce or even secure medical assistance during one-third of the year; and if he was yet in a position to state to what extent the construction of the road between these two places was to be accelerated during the current year.—Mr. THOMAS replied: I am aware that complaints have been made. The expenditure of £25,000 on the construction of the road during the current year has already been approved, and I hope that, if the financial position permits, it will be possible to make increased provision later in the year.

Poison Gas and Food Contamination

Mr. WILSON asked the Minister for the Coördination of Defence what steps had been or were being taken in Sheffield for the prevention of the contamination of food-supplies in the event of an air attack in which poison gas was used.—Sir T. INSKIP replied: I am not aware of any particular steps which have been or are being taken in Sheffield, but I am informed that the Home Office is preparing for general guidance a memorandum on the protection of food-supplies against gas contamination. When this is published local authorities will be asked to take whatever precautions seem desirable, acting in collaboration with local merchants and purveyors of foodstuffs.

Death of Child at a Children's Home

Mr. LOVAT-FRASER asked the Minister of Health if his attention had been called to the death of a boy of six years of age at the Burnham-on-Sea Children's Home on Feb. 9th, in respect of which a jury returned a verdict that the cause of death was shock caused by intense cold in a case of malnutrition of body and multiple minor injuries; and if he would ascertain and inform the House what were the multiple minor injuries from which the child was suffering.—Sir KINGSLEY WOOD replied: I am aware of this case which has received careful consideration and has been fully investigated by a special committee appointed by the county council as a result of which the appointment of the matron of the home has been terminated.

MONDAY, APRIL 27TH

Accredited Milk Producers' Scheme

Sir PERCY HURD asked the Minister of Agriculture how many milk producers had entered the accredited milk producers' scheme and the amount of their gallonage in relation to the total milk sales in England and Wales.—Mr. ELLIOT replied: The number of accredited producers as at April 1st, 1936, was 15,762. The number who were on the roll during March was 15,350, and sales by these producers in that month under the Milk Marketing Scheme amounted approximately to 24½ million gallons, equal to nearly 30 per cent. of the total sales under the scheme during that month.

Cleanliness of Imported Butter

Mr. LAMBERT asked the Minister of Health if he had information as to the condition of the cows in the Soviet Union, Finland, Estonia, Latvia, and Lithuania from which countries butter was exported to Great Britain; and if he was satisfied as to the cleanliness of the methods employed in making such butter.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: No, Sir, but my right hon. friend is advised that practically all milk and cream used in the preparation of imported butter is pasteurised.

TUESDAY, APRIL 28TH

Overcrowding in Scotland

Mr. MAXTON asked the Secretary of State for Scotland how many reports as to the state of overcrowding had

now been received, what percentage that number was of the total, and what was the percentage of overcrowded houses as revealed by the reports.—Sir GODFREY COLLINS replied: Reports have been received from 216 local authorities, representing 94·7 per cent. of the total number of local authorities in Scotland. The percentage of overcrowding in surveyed houses as revealed by these reports is 23·5 per cent.

National Health Insurance and Dental Benefit

Sir ARNOLD WILSON asked the Minister of Health (1) how many men and women, approximately, were entitled to dental benefit at the rate of 50 per cent., more than 50 per cent., less than 100 per cent., and 100 per cent. of the cost of treatment, respectively; and how many men and women so entitled in each category actually received treatment during 1934; (2) whether he was aware that the amount spent on dental benefit under the National Health Insurance Acts had fallen steadily from £2,425,000 in 1930 to £1,791,000 in 1934, whereas the sum of £2,437,000 was available in that year for dental benefit; and whether, in view of the need for an extension of dental benefit to all insured persons, he would initiate special inquiry into the position; and (3) whether he was aware that, out of an insured population of 12,000,000 men and 6,000,000 women, only 9,000,000 men and 2,000,000 women were at present entitled to dental benefit, and of the 11,000,000 persons thus eligible only 700,000 received treatment of any kind during 1934; and whether, in view of this evidence that the dental benefit scheme was not meeting the needs of insured persons, he would initiate a special inquiry into the position.—Sir KINGSLEY WOOD replied: The figures given by my hon. friend are approximately correct. As he is aware, however, dental benefit can be provided under the National Health Insurance Act only by an approved society which has a disposable surplus on valuation and which elects to include it in its scheme of additional benefits. It is estimated that about two-thirds of the insured persons entitled to dental benefit are covered by schemes which provide for the payment of 50 per cent. of the cost of treatment. The proportion of the total entitled to receive the full cost of dental treatment is very small. No particulars are available as to the numbers of men and women in the various categories referred to, and to obtain this information it would be necessary to ask for a return from each of the 5000 societies and branches which provide the benefit. The Royal Commission on National Health Insurance in 1926 reported that the provision of dental benefit as a statutory benefit available to all insured persons could be met only by an increase in the contributions, and nothing has since arisen to alter that conclusion. I am not therefore prepared to institute a special inquiry as suggested by my hon. friend.

MEDICAL NEWS

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—O. H. Galloway, Royal Colleges, Edinburgh; L. Gottlieb, Univ. of Frankfort and London Hosp.; M. G. H. Jones, Welsh National School of Medicine and St. Mary's Hosp.; N. Mukherjee, Univ. of Durham; M. A. Partridge, Univ. of Oxford and Guy's Hosp.; E. C. Randell, Royal Free Hosp.; C. J. S. Sergel, Univ. of Cambridge and St. Mary's Hosp.; and P. Tobin, Middlesex Hosp.

Medicine.—B. Jensen, Univ. of Liverpool; P. D. Lynch, Guy's Hosp.; E. C. Randell, Royal Free Hosp.; H. M. Sinclair, Univ. of Oxford and Univ. Coll. Hosp.; and J. W. Thomas, Welsh National School of Medicine.

Forensic Medicine.—B. Jensen, Univ. of Liverpool; P. D. Lynch, Guy's Hosp.; E. C. Randell, Royal Free Hosp.; H. M. Sinclair, Univ. of Oxford and Univ. Coll. Hosp.; H. W. Smithies, St. Mary's Hosp.; and J. W. Thomas, Welsh National School of Medicine.

Midwifery.—C. L. Blacklock, Univ. of Cambridge and Guy's Hosp.; J. T. Boocock, Univ. of Leeds; E. R. Brown, Guy's Hosp. and Univ. of Leeds; N. Mukherjee, Univ. of Durham; E. C. Randell, Royal Free Hosp.; F. Schwartz, Charing Cross Hosp.; H. M. Sinclair, Univ. of Oxford and Univ. Coll. Hosp.; and R. L. Williams, London Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: M. G. H. Jones, P. D. Lynch, M. A. Partridge, E. C. Randell, and H. W. Smithies.

Institute of Medical Psychology

The Sir Halley Stewart trust has granted a research fellowship for three years to this institute, and it has been awarded to Dr. Erich Wittkower for the continuation of his research on the influence of the emotions on the functions of the organs. His monograph on this subject, based on work at the Charité in Berlin, and latterly at the Maudsley Hospital, was reviewed in our issue of March 21st (p. 673).

Chadwick Public Lectures

On Thursday, May 7th, at 8.15 P.M., at the Royal Institute of British Architects, 66, Portland-place, London, W., Mr. S. D. Adshead, professor of town-planning in Liverpool University, will give a lecture on London under statutory town-planning. On Thursday, June 11th, at 5 P.M., in the Chelsea Physic Garden, Swan-walk, S.W., Sir William Willcox will lecture on plant pharmacology and medical practice. Both meetings have been arranged by the Chadwick Trust, and further information may be had from the secretary at 204, Abbey House, London, S.W.1.

Mr. G. Gordon-Taylor has been elected a corresponding fellow of the Vienna Surgical Society.

International Congress of Dentists

We are informed that the ninth International Congress of Dentists will be held in Vienna in August, and the International Dental Exhibition, which will be held there at the same time.

University of London Medical Graduates Society

The annual general meeting and dinner of this society will be held at the Langham Hotel, Portland-place, London, W., on Tuesday, May 12th, at 7 for 7.30 P.M., when the guest of honour will be Mr. H. L. Eason, the vice-chancellor of the University. The hon. secretary may be addressed at 38, Queen Anne-street, London, W.1.

Demonstrations of Contraceptive Technique

On Thursday, May 7th, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Medical practitioners and senior students only should apply for tickets to the hon. secretary of the Society and Clinic for Constructive Birth Control, 108, Whitfield-street, London, W.1.

The Guardianship Society

At the annual meeting of this society at Brighton on April 18th the gathering stood in silence as a tribute to the memory of the late Miss Grace Woodhead, the founder and hon. secretary of the society. When she was living at Heathfield in Sussex some 35 years ago, Miss Woodhead had the idea of boarding out London children for country holidays. This drew her attention to the large number of children who were mental defectives, and in 1913, in compliance with the Mental Deficiency Act of that year, she formed the society and moved her headquarters to Brighton. The growth of the work is marked by the fact that during 1935 no fewer than 1190 cases were under the care of the society in an occupational centre, on training farms, or in charge of foster parents. Dr. S. E. Gill, formerly a commissioner of the Board of (Lunacy) Control, has taken over the duties of hon. secretary, and he is also medical director. At the meeting an address was given by Dr. F. Douglas Turner, medical superintendent of the Royal Eastern Counties Institution at Colchester. He said that the higher-grade mental defectives could with proper care and training be made fit to play a useful part in the world's affairs. The society was playing an important part in the struggle for the ideal of a resocialisation of the mentally deficient.

King's College Hospital, London

An anonymous donor has given £4000 of housing stock to this hospital. The money is to be available for general purposes.

New Municipal Hospital at Huddersfield

A site has been chosen for a new municipal hospital which is to be erected at a cost of £100,000, and is to have 160 beds with accommodation to allow extension to 250 beds.

Gift to St. Mary's Hospital, London

Lord Beaverbrook has given £24,900 to this hospital. In 1929 he gave £63,000 towards the rebuilding of its medical school.

Post-graduate Course at St. Bart.'s

A post-graduate course, open to all medical practitioners, will be held at St. Bartholomew's Hospital medical college on June 18th, 19th, and 20th. On Thursday afternoon surgical and medical cases will be shown, and there will be a pathological demonstration. Members of the course will also be welcome in the operating theatres on that afternoon. Lectures will be given on Friday by Dr. F. G. Chandler (asthma and emphysema), Mr. Basil Hume (surgical treatment of gastric and duodenal ulcers), Mr. F. C. W. Capps (diagnosis and treatment of sinusitis), Mr. S. L. Higgs (deformities of the spine), Prof. L. J. Witts (anæmia in women), and Mr. R. S. Corbett (fractures of the leg), and on Saturday by Prof. Paterson Ross (head injuries), Dr. Geoffrey Bourne (the use and action of drugs in heart failure), Mr. John Beattie (contraceptives), Mr. H. W. Rodgers (technique and uses of gastroscopy), and Dr. A. W. Spence (recent advances in hormone therapy). The course will conclude with a lecture on anæsthesia and analgesia in labour. Further information may be had from the dean of the college.

Progress in Maternal and Child Welfare

Sir Kingsley Wood, Minister of Health, speaking on Monday at the annual general meeting of the East End Maternity Hospital, gave figures showing the progress and results of maternity and child welfare work in England and Wales during 1935. The outstanding event of the year was the establishment of a new low record in the rate of deaths of infants under one year of age, the figure for England and Wales being 57 per 1000 live births, as against 66 in 1931, 83 in 1921, and 130 in the year 1911. The key to the reduction of infant mortality had been in particular, he thought, the education and instruction of the mother through the infant welfare centres, the health visitors, and the institutions dealing more especially with maternal care. The number of infant welfare centres had increased by 117 during the year, and now numbered over 3300. The number of children under one year of age who attended them for the first time during the year was 351,000, being 58 per cent. of the total number of births during 1935. Visits were paid by health visitors to 584,000 children under one year of age, being over 97 per cent. of the total births. It was also satisfactory, though there was need for expansion, that 588,000 children between the age of 1 and 5 years attended the centres in 1935 against 546,000 in 1934. It was a matter of concern on the other hand that the recorded rates of maternal mortality had remained comparable with those of 30 years ago. The provisional figure for 1935 of maternal deaths per 1000 live births in England and Wales had however been found to be 4·10, which compared with a rate of 4·60 for 1934, and was the lowest figure recorded since 1925 when the rate was 4·08. The actual number of maternal deaths in 1935 was 2457, or 291 less than in 1934, although the number of births in 1935 was rather more than in 1934. But there was much more to be done in investigation and endeavour. It was a gratifying fact that for the years 1921–28 the maternal mortality-rate of the patients of the East End Maternity Hospital was only 0·68 per 1000 births, and that in the seven years that followed only 21 deaths had occurred in over 13,500 confinements.

Air Ambulances in Britain

Speaking at the annual meeting of the Surrey branch of the British Red Cross Society at Wimbledon last Monday, Mr. S. J. Noel-Brown said that Great Britain is much behind other countries in air ambulance services; "France, Sweden, Italy, Poland, and the United States all have organised ambulance organisations, but, generally speaking, we are years behind." The society had given a valuable lead by the formation of its air ambulance detachment, and one of the leading makers of civil aircraft was completing the first British complete aeroplane to be designed and built as a flying hospital. In addition to the usual equipment of a dressing station, the machine would carry blood transfusion apparatus and an oxygen tent. The air would provide rapid and comfortable transport for the sick and injured, and it was reasonable to anticipate that in the not distant future every municipal authority possessing its own aerodrome would have its own air ambulance units.

Appointments

ASHBY, W. R., M.D. Camb., D.P.M., has been appointed Pathologist, St. Andrew's Hospital, Northampton.

BRAMLEY, G. F., M.D. Leeds, D.P.H., Medical Officer of Health for Bexley.

LOWE, JOHN, M.D., F.R.C.S. Edin., Chief Medical Officer and Superintendent to the G.W.R. Medical Fund Society, Swindon.

POLLITT, ALFRED, M.B. Dub., D.M.R.E., Assistant Radiologist at University College Hospital.

Medical Referee under the Workmen's Compensation Act, 1925: GEORGE LOUIS MALCOLM SMITH, M.B., Ch.B., F.R.C.P., of Edinburgh, for the Midlothian and Peebles Sheriff Court Districts (Sheriffdom of the Lothians and Peebles).

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I.) and (II.) = Assistant Medical Officer, Grades I. and II.:

GRAY, G. M., M.B. Edin., F.R.C.S. Eng., A.M.O. (I.), St. Mary Abbots;

BAGSHAW, H. B., M.R.C.S. Eng., F.R.C.S. Edin., A.M.O. (I.), Lambeth;

DORLING, G. C., F.R.C.S. Eng., A.M.O. (I.), St. Alfege's;

JAMES, CLIFFORD, M.D. Lond., A.M.O. (I.), Lewisham;

HURFORD, J. V., M.D. Belf., D.P.H., A.M.O. (II.), Colindale;

MCILROY, ALEXANDER, M.B. N.Z., A.M.O. (II.), New End;

GRIFFIN, T. F. R., M.B., A.M.O. (I.), Mile End;

FARRINGTON, G. G., M.B. Lond. A.M.O. (I.), St. George-in-the-East;

HART, V. E. L., M.R.C.S. Eng., A.M.O. (II.), Lewisham;

OLDAKER, JOAN M., M.B. Lond., A.M.O. (II.), St. Leonard's;

QUINN, T. R., M.B. Sydney, F.R.C.S. Edin., House Surgeon, St. Mary Abbots;

MCWHIRTER, J. R., M.B. Belf., House Physician, St. Luke's (Chelsea);

HYNES, H. T. J., M.R.C.S. Eng., House Physician, Dulwich;

BURBRIDGE, D. H. D., M.R.C.S. Eng., House Physician, St. Andrew's;

WARDALE, ALAN, M.R.C.S. Eng., House Physician, St. Giles';

BARNES, J. E. M., M.R.C.S. Eng., House Physician, St. James';

BARRETT, JOHN, M.D. Irel., House Surgeon, St. James';

HENRY, T. C., M.R.C.S. Eng., House Physician, St James';

STEIN, SIDNEY, M.R.C.S. Eng., House Physician, St. Giles';

LIPPITT, W. N., M.R.C.S. Eng., House Physician, St. Olave's;

MACLEAN, W. E., M.B., Ch.B. St. And., House Physician, St. Olave's;

SALKIELD, J. P., M.R.C.S. Eng., House Physician, St. Mary Abbots;

PARK, JACK, M.B. Edin., House Surgeon, St. Mary Abbots;

SEGALOV, COLEMAN, M.R.C.S. Eng., House Physician, St. Alfege's;

ERSKINE, DAVID, M.B. Lond., D.P.H., House Physician, North-Western;

WALKER, E. O., M.R.C.S. Eng., A.M.O. (II.), St. Luke's (Chelsea);

ANDERSON, I. G., M.B. Lond., A.M.O. (II.), Lewisham;

ROSS, J. A., M.B. Edin., A.M.O. (II.), St. Andrew's;

CLOTHIER, JOHN G., M.B., House Physician and House Surgeon, St. Alfege's;

LILLIS, W. J. P., L.R.C.S. Irel., Senior A.M.O. (II.), Northern;

LLOYD, E. T., M.R.C.S. Eng., D.P.H., Senior A.M.O. (II.), South-Western;

DENNISON, F. R., M.D. Lond., D.P.H., A.M.O. (I.), Colindale;

BRADBURY, ERIC, B.Chir. Camb., A.M.O. (I.), St. Peter's;

BAX, E. C., B.Sc., L.M.S.S.A., A.M.O. (II.), Constance-road Institution;

FURST, H. C., B.Sc. Sydney, L.R.C.P. & S. Edin., A.M.O. (I.), Lambeth;

BYRNE, P. A., M.B., B.Ch., B.A.O. Dub., A.M.O. (II.), Constance-road Institution;

BJORKEGREN, MARGARET E., M.R.C.S. Eng., D.P.H., Senior A.M.O. (II.), Northern;

PEARCE, RICHARD, M.D. Camb., A.M.O. (I.), Paddington.

NOTES, COMMENTS, AND ABSTRACTS

JOINT LUBRICATION

BY ERIC SHIRLEY JONES, M.R.C.S. Eng.

BECAUSE the engineer has an extensive knowledge of lubrication in machine bearings, it is instructive to apply his principles to the human joint, and in a former article I described experiments which showed the value of synovial fluid as a lubricant (THE LANCET, 1934, i., 1426).

In 1886 Osborne Reynolds formulated his law [1] which states that a well-lubricated shaft, rotating at a fair speed, becomes separated from its bearing by a film of liquid oil, which is under pressure. The frictional resistance is then entirely due to the viscosity of the oil. Much work has since been done and present knowledge may be roughly summed up by considering a horizontal shaft, at first stationary in its bearing, and then rotating at some speed.[2] At rest, the shaft lies in line-contact with the bearing, so that no fluid oil intervenes and there is a form of solid contact

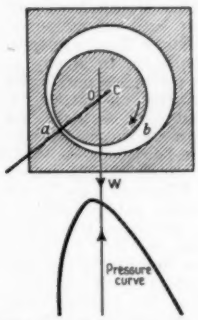

FIG. 1.—Transverse section of a horizontal shaft rotating in a bearing.

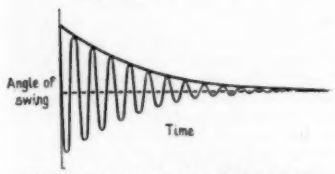

FIG. 3.—Graph of rate of slowing in fluid friction.

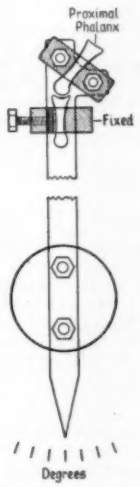

FIG. 2. — The modified Stanton pendulum. Length=7 ft. 6 in.

of what is called the "boundary layers." This is a layer of oil a few molecules thick in chemical combination with the metal and has the characteristics of a solid.[3]

On rotating, the shaft takes up another position eccentric to the bearing (Fig. 1) and the line of centres (CO) meets the bearing at the "point of closest approach" (*a*). The oil-space from (*b*) to (*a*) is wedge-shaped, and into this space oil is continually dragged by the rotating shaft. Since the outlet is smaller than the inlet a pressure film forms, which exerts a pressure equal and opposite to the load on the shaft (W). The curve below shows the pressure. It will be noted that while the resultant acts in opposition to the load, the peak is beyond the load line on the outlet side of the film. Thus a heavily loaded shaft can rotate, literally floating on a pad of oil and having no contact with its bearing.

There are three essentials for the formation of this pressure-film: the viscosity of lubricant, the speed of rotation, and the eccentricity of the shaft.[4]

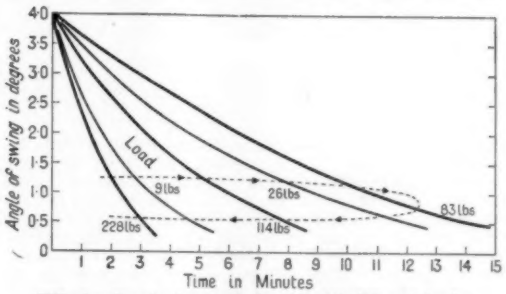

FIG. 4.—Graph of rate of slowing with different loads. Fluid friction.

In engineering practice all the following are known or can be calculated :—

(*a*) Inlet and outlet thickness of the film.
(*b*) ,, ,, temperature of the oil.
(*c*) ,, ,, viscosity of the oil.
(*d*) The pressure at all points in the film.

It seems probable that the physical laws which govern the behaviour of lubrication in a bearing also apply to that in a joint, and reflection on our ignorance of the matter should lead to a healthy feeling of humility. Since clearances are of the order of thousandths of an inch, it is not possible at once to decide whether there is solid or fluid friction. The relationships of friction, load, and speed, however, can be measured. In the first, friction is proportional to load and is unaffected by speed (Amonton's law [5]), while in the second, friction bears no relation to load, but varies with the square root of the speed.[6]

Some testing apparatus was needed to compare load and friction, and the Stanton pendulum [7] was modified (Fig. 2). The original apparatus was used by the late Dr. Stanton at the National Physical Laboratory for the study of friction in heavily loaded bearings and consists of a heavy pendulum swinging through a few degrees with the bearing under test as its pivot. The proximal interphalangeal joint of an amputated finger replaced the bearing: the middle phalanx was fixed, and the proximal phalanx was clamped to the side members of the pendulum. By studying the way in which it slows down, it is possible to see how the friction varies, and whether it is proportional or not to the fixed load.

It has been shown that if friction does not vary both the time and the loss of swing will be the same for each oscillation. It follows that a graph of the slowing down will show that a straight line can be drawn through the extreme points of all the swings. This is the criterion of solid friction. Should the friction, however, be related to a speed

COEFFICIENT OF FRICTION OF INTERPHALANGEAL JOINT. (LOAD, 13 LB. 5 OZ.; TEMP., 54° F.)

Angle of swing, degrees	4·0	3·5	3·0	2·5	2·0	1·5	1·0	0·5
Number of oscillations per half degree	11	13	16	21	27	58	56	
Coefficient of friction	0·114	0·097	0·079	0·060	0·047	0·033	0·022	
Rubbing speed, ins. per min.	0·8	0·8	0·7	0·6	0·5	0·3	0·2	

that is steadily falling, a curve will result, since the friction tending to stop the motion will decrease with the speed (Fig. 3). This is to be expected where fluid friction is the stopping force.

The pendulum was first swung from a knife-edge to discover the effect of air resistance and this was found to be negligible. Fig. 4 shows the type of swing obtained with loads from 9 lb. to 228 lb., and it will be noted that all are curved, meaning that fluid film lubrication occurred in all throughout the main part of the swing. The result in the heaviest load (228 lb.) is particularly noteworthy, as it amounts to a surface pressure of about 900 lb. per sq. in. At this load crushing of bone set in. The coefficients of friction—

$$\mu = \frac{\text{friction}}{\text{load}}$$

can be calculated and these have been added in the Table. Mr. C. Jakeman, of the National Physical Laboratory, has kindly examined the curves, and believes that they represent mixed lubrication—i.e., a fluid film during movement and solid friction at the starting and stopping points. It seems to follow from Reynolds's law that there can be no fluid film between the surfaces while at rest or at the moment of beginning movement before the film has had time to form. There must then be some kind of solid friction, but the nature of this is not known. There may be friction equivalent to that between dry articular cartilage, or some form of "boundary" or "greasy" friction, for Timbrell Fisher has shown [8] that there is mucin inside the articular cartilage.

An inherent defect of the apparatus is that it allows one to estimate the friction only for a complete swing, and *not* that at the middle or end. A machine is now being made to allow the friction to be read at all points of the cycle of movement, and it is hoped to communicate results when they become available.

CONCLUSIONS

1. Fluid film lubrication is the usual form of lubrication in human joints.

2. The pressure-film is dependent for its formation upon (*a*) viscosity of lubricant, (*b*) speed of surfaces, (*c*) eccentricity of surfaces.[9]

3. The film survives a load which can crush bone.

4. Some form of solid friction must occur when speed and/or eccentricity are not enough to maintain a pressure-film.

The coefficients of friction so far obtained are high compared with those in machinery, but there was a high viscosity of the lubricant because the experiments were carried out at a temperature many degrees below that of the body.

My thanks are due to Mr. Dee, of Birmingham University, Mr. C. Jakeman, of the National Physical Laboratory, and Mr. E. C. Ulrich.

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HOSPITAL "CALL-SYSTEMS"

THE ancient sport of finding the house surgeon, played in various ways in different hospitals, is more or less difficult according to the technique employed and the size of the hospital. The system still obtains, in at least one large hospital, of using one or more porters as bloodhounds to track down the victim. These sleuths are forbidden to return to the base until they have delivered their message and the sight of them, travel-stained, weary, and hopelessly out of scent, is an all too common one. Improvements in this primitive and labour-wasting device has been made and in certain hospitals in the United States loud speakers, operated from the telephone-board, are fixed in the corridors. Two obvious disadvantages of the loud-speaker system are that it is impossible to call several persons simultaneously and that it disturbs the quiet so much to be desired in a hospital. The call-system, with signal-boards bearing electrically illuminated numbers, is better than the loud-speaker, but some time may elapse before the victim sees that his number is up; though doubtless, should he try to turn a blind eye, kind friends will hasten to point it out to him.

Mr. H. Ekman, chief engineer of the electric plants of the fire-brigade in Stockholm, has ingeniously improved the above system, and an account of his method, supplied by Prof. Einar Key, appears in the February issue of the *Hospital*. In every possible haunt of the house surgeon (or other person likely to be wanted at short notice) there is a marking-cabinet on which is a number of buttons, each marked with the name of one of the persons incorporated in the system. At the telephone-board is a "call" or "seeker" table furnished with a like number of similarly marked buttons. There is also, in full view of the operator, a light-signal table with a signal-lamp for each haunt (ward, operating-theatre, laboratory, &c.). The house surgeon, Mr. X, notifies his entrance to any particular haunt by pressing his button on the marking-cabinet. Should Mr. X be wanted, the operator presses the button marked X on the call table and the signal-lamp of the ward in which Mr. X last pressed his button lights up. At the Maria Hospital, Stockholm, the device has been still further improved. If the house surgeon is called by the operator and has neglected to check in anywhere by pressing his button, the next time he does press a button he receives not, as might be supposed, the shock he deserves but a buzzing signal which tells him that he is wanted. By pressing a special cancellation button he may temporarily "sport his oak" and cease to exist so far as the system is concerned. On the other hand, he may do so unwittingly by neglecting to indicate a fresh location and so become temporarily and inconveniently "lost."

A still more recent attempt has been made to improve on the above system by using display panels showing a double row of lamps. On one row, each lamp represents a calling party; on the other, an official required. To draw attention to the display, signals audible but not loud enough to disturb the patients or intermittent flashes are used, the whole being under the control of a telephone operator. This system, which is described in the April issue of the *Hospital*, can only call one person at a time, but appears to be the best so far devised. To the frivolously inclined these light-signal systems seem to offer facilities for practical joking on a large scale. As to what might happen were the apparatus to become slightly deranged so that everybody received somebody else's call, we must leave to the imagination.

PREDISPOSING CAUSES OF UTERINE CANCER

IN a study of 982 cases of carcinoma of the uterus, comprising 879 of cancer of the cervix and 103 of cancer of the body, P. Natale endeavours to determine the ætiological factors concerned (Tumori, 1935, ix., 185). He decides that the following are of minor importance: race, social position, functional dis-

turbances of the uterus or ovaries, sexual abuse, heredity, and individual constitution. As regards age, he emphasises that carcinoma of the uterus may develop at any period of life; in the present series the maximal incidence was at 50–54, while if cervical and corporal cases were separately considered, the former showed the highest incidence between 40 and 54, the latter between 60 and 64. Natale reaches the common conclusion that the most important predisposing factor is some antecedent lesion of the cervix, especially of an inflammatory character. A history suggestive of chronic cervicitis was obtained in a very large proportion of the cases of cancer of the cervix, and since none of these women had had any medical or operative treatment for the former condition, he believes that many of them would have been saved from developing carcinoma had such treatment been carried out. To support this view he quotes Bossi, who in a series of 7000 cases of plastic operations on the cervix, followed up for many years, had no cases of subsequent cancer. Unlike most investigators, Natale finds that multiparity has little influence upon the incidence of cervical carcinoma; of his 879 patients as many as 132 (15 per cent.) had borne no children. On the other hand, the 103 cases of cancer of the body of the uterus included 40 (38 per cent.) nulliparæ.

PLACENTAL EXTRACT IN MEASLES.—The Bioglan Laboratories, Ponsbourne Manor, Hertford, inform us that they are willing to supply Embryonin, a placental extract, to hospitals that wish to test its value in the prophylaxis of measles.

SAN TOOTHBRUSH.—One of the chief disadvantages of a toothbrush is that parts of the teeth are inaccessible to its action. It is difficult to remove the stagnant detritus accumulated in the interspaces, and the adjacent surfaces cannot be cleaned. The San toothbrush is constructed to overcome this in a simple way. Very similar to many brushes in common use, it differs in one particular—the end of the handle is U-shaped. The resilient prongs are notched and a thread can be fixed so that a length of about ¾ in. is held taut by the notches. This can be passed to and fro between the teeth. Besides cleaning, another useful purpose is served when fraying of the smooth thread reveals a sharp surface, the result of hidden decay. The makers (S. Aki Shoten, 30, City-road, London, E.C.1) also supply lengths of floss silk that have been treated with an abrasive dentifrice.

Vacancies

For further information refer to the advertisement columns

Accrington, Victoria Hospital.—H.S. £150.
Acton Hospital, W.—Hon. Cons. Physician.
Altrincham General Hospital.—Jun. H.S. At rate of £120.
Belfast, Forster Green Hospital, Fortbreda.—H.P. At rate of £150.
Birkenhead Education Committee.—Asst. School M.O. £500.
Birmingham and Midland Eye Hospital.—Res. Surg. O. £200.
Birmingham, Selly Oak Hospital.—Jun. M.O. At rate of £200.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.
Brighton, New Sussex Hospital for Women, Windlesham-road.—H.S. £100.
Brighton, Royal Alexandra Hospital for Sick Children.—H.P. £120.
Bristol City and County Mental Hospital.—Med. Supt. £1000.
Burton-on-Trent, General Infirmary.—H.P. and Cas. O. £150.
Cambridge, Addenbrooke's Hospital.—Res. Surg. O. £225. Also H.P. At rate of £130.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Assts. in Out-patient Dept.
Chester, East Lancashire Tuberculosis Colony, Barrowmore Hall, Gt. Barrow.—H.P. At rate of £150.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—Med. Reg.
Coventry, Gulson-road Municipal Hospital.—2nd Asst. Res. M.O. £250.
Dewsbury County Borough.—M.O.H. and School M.O. £900.
Doncaster, Royal Infirmary and Dispensary.—H.S. At rate of £175.
Durham County Council.—District Tuber. M.O. £500.
Eastbourne, Royal Eye Hospital, Pevensey-road.—H.S. £275.
Epsom County Hospital.—Res. Asst. M.O. At rate of £375.
Evelina Hospital for Sick Children, Southwark, S.E.—Part-time Pathologist. £250–£300
Exeter, Devon Mental Hospital, Exminster.—Jun. Asst. M.O. £350.
Farcham, Hants, Knowle Mental Hospital.—Deputy Med. Supt. £700.
Folkestone, Royal Victoria Hospital.—Jun. Res. M.O. At rate of £120.
Glasgow, Southern General Hospital.—Deputy Med. Supt. £500.
Gordon Hospital for Rectal Diseases, Vauxhall Bridge-road, S.W.—Res. H.S. At rate of £150.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hertford County Hospital.—H.S. At rate of £180.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. H.P. and Res. H.S. Each at rate of £100.
Hull Royal Infirmary.—H.S. to Ophth. and Ear, Nose, and Throat Dept. Also Second Cas. O. Each at rate of £150.
Ipswich, East Suffolk and Ipswich Hospital.—Orthopædic Surgeon. £500.
Ipswich Mental Hospital.—H.P. At rate of £150.
Isolation Hospital, Muswell Hill, N.—Res. M.O. £500.
Kidderminster and District General Hospital.—H.S. £150.
Kilmarnock Infirmary.—H.P. and H.S. Each £110.
Kingston District Hospital.—Res. Asst. M.O. At rate of £375.
Leeds, St. James's Hospital.—Res. M.O. Also Res. Surg. O. Each £350.
Leicester Royal Infirmary.—Hon. Asst. Radiologist. Also Visiting Anæsthetist.
Liverpool, Stanley Hospital.—H.S. At rate of £100.
Liverpool University.—Lecturer in Dept. of Bacteriology £600–£700.
Llanelly and District Hospital.—H.S. £150.
London Child Guidance Clinic, 1, Canonbury-place, N.—Three Fellowships in Psychiatry. Each £300.
London County Council.—Asst. M.O. £600. Sen. Asst. M.O.'s, Grade II. Each £500. Also Asst. M.O., Grade II. £250.
London Homœopathic Hospital, Great Ormond-street, W.C.—H.S. At rate of £100.
London (R.F.H.) School of Medicine for Women, Hunter-street, W.C.—Demonstrator in Physiology. £250–£300.
Macclesfield General Infirmary.—Sen. H.S. At rate of £180.
Manchester, Ancoats Hospital.—H.S. for Ear, Nose, and Throat Dept. At rate of £100.
Manchester City.—Vacancies on Consultant Medical, Surgical, &c., Staffs of Municipal Hospitals. £125–£400.
Manchester Royal Children's Hospital, Pendlebury.—Res. Surg. O. At rate of £125.
Manchester Royal Infirmary.—Hon. Asst. Surgeon. Also H.S. At rate of £50.
Manchester, Victoria Memorial Jewish Hospital, Cheetham.—Cas. O. At rate of £125.
Manor House Hospital, Golders Green, N.W.—Jun. M.O. £200.
Margate, Royal Sea-Bathing Hospital.—H.S. At rate of £200.
Mount Vernon Hospital, Northwood.—H.S. At rate of £150.
National Temperance Hospital, Hampstead-road, N.W.—H.P. At rate of £100.
Newcastle-upon-Tyne Hospital for Sick Children.—Hon. Physician to Skin Dept.
Northampton General Hospital.—H.S. At rate of £150.
North Riding of Yorkshire C.C.—County M.O.H. and Schoo M.O. £1200.
Norwich, Norfolk and Norwich Hospital.—H.S. Also Cas. O. Each £120.
Oxford, Wingfield-Morris Orthopædic Hospital, Headington.—Lord Nuffield Scholarship in Orthopædic Surgery. £200.
Plymouth, Prince of Wales's Hospital, Greenbank-road.—H.S At rate of £120.
Preston, Whiston Public Assistance Institution, near Prescot.—Visiting Surgeon. £450.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.S. At rate of £100.
Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. O. Each at rate of £100. Also Clin. Asst. to Surgical Out-patients. 5s. per attendance.
Redhill, Royal Earlswood Institution.—Jun. Asst. M.O. At rate of £250.
Rotherham, Oakwood Hall Sanatorium.—Asst. M.O. £300.
Royal Free Hospital, Gray's Inn-road, W.C.—Asst. M.O. £350.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hospital, Holloway, N.—H.S. and H.P. Each at rate of £70.
Royal Society of Medicine, 1, Wimpole-street, W.—Nichols Fellowship. £150.
St. Bartholomew's Hospital, E.C.—Surgeon.
St. John's Hospital, Lewisham, S.E. S.E.—Hon. Ophth. Reg.
Sheffield Royal Infirmary.—Ophth. H.S. At rate of £120.
Southampton Isolation Hospital and Sanatorium.—Jun. Res. M.O. £200.
Southampton, Royal South Hants and Southampton Hospital.—Sen. H.S. £200. H.P., H.S. Also Res. Anæsthetist and H.S. to Ear, Nose, and Throat Dept. Each at rate of £150.
Stafford, Prestwood Sanatorium.—Jun. Asst. M.O. £250.
Stoke-on-Trent City.—Asst. Tuber. O. £500.
Sunderland Royal Infirmary.—H.S. and H.P. Each £120.
Surrey County Council.—Asst. M.O. £600.
Swansea General and Eye Hospital.—H.P. and Cas. O. Each at rate of £175.
Warwickshire and Coventry Mental Hospital.—Med. Supt. £1200.
Wembley U.D.C.—M.O.H. £1000.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Asst. Surgeon.
Wolverhampton Royal Hospital.—H.P. At rate of £125.
Woolwich and District War Memorial Hospital, Shooter's Hill, S.E.—Hon. Asst. Obstet. Surgeon. Also two H.S.'s. Each at rate of £100.
York County Hospital.—H.P. £150.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Penarth (Glamorgan) and Old Deer (Aberdeen).

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, May 5th.
Orthopædics. 5.30 P.M. (Cases at 4.30 P.M.) Annual General Meeting. Mr. Laming Evans: 1. Osteochondritis of Lower Epiphysis of Femur. Mr. V. H. Ellis: 2. Pathological Fracture of the Tibia. Mr. H. J. Seddon: 3. Empyema Secondary to a Tuberculous Spinal Abscess. 4. Rupture of a Tuberculous Spinal Abscess into the Œsophagus.
WEDNESDAY.
History of Medicine 5 P.M. Annual General Meeting. Dr. J. A. Glover: Finding an Asklepion, and Some Minor Archæological Adventures in a Doctor's Life.
Surgery. 5.30 P.M. Annual General Meeting.
THURSDAY.
Tropical Diseases and Parasitology. 8.15 P.M. Dr. P. H. Manson-Bahr: The Diagnosis and Treatment of Dysentery and Colitis in Tropical Practice. (Presidential Address.)
FRIDAY.
Clinical. 5.30 P.M. (Cases at 4.30 P.M.) Annual General Meeting. Cases. Dr. M. L. Rosenheim (for Dr. J. W. McNee): 1. Myxœdema Strongly Resistant to Thyroid Treatment. Dr. J. H. Lawrence (for Dr. McNee): 2. Extraordinary Recurrent Pyrexia of Over Two Years' Duration. Dr. Philip Ellman: 3. Bilateral Pulmonary Tuberculosis Treated by: (*a*) Partial Artificial Pneumothorax for the Right Lung. (*b*) Thoracoplasty for the Left Lung. (*c*) Insulin.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.
THURSDAY, May 7th.—8 P.M. (B.M.A. House, Tavistock-square, W.C.), Dr. Alfred Adler: The Psychological Approach.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY, May 8th.—8.45 P.M. (Miller General Hospital, Greenwich), Dr. J. R. Wylie: The Functions of a Radiologist. (Presidential Address.)

BIOCHEMICAL SOCIETY.
SATURDAY, May 9th.—2.45 P.M. (Rockefeller Department of Biochemistry, Museum, Oxford), Short Communications and Demonstrations.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF LONDON.
TUESDAY, May 5th, THURSDAY, and FRIDAY.—5.30 P.M. (London School of Hygiene, Keppel-street, W.C.), Prof. A. Butenandt: Biochemistry of the Sterol Group.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, May 4th.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Prof. R. W. Johnstone: Hormone Therapy in Gynæcology.
TUESDAY.—2 P.M., Prof. E. H. Kettle: Pathological Demonstration. 3 P.M., Dr. Janet Vaughan: The Monocyte-lymphocyte Ratio.
WEDNESDAY.—Noon, Clinical and pathological conference (medical). 2.30 P.M., Clinical and pathological conference (surgical).
THURSDAY.—2.30 P.M., Dr. W. S. C. Copeman: Arthritis. 3 P.M., Dr. Chassar Moir: Operative Obstetrics. 2.30 P.M., Sir Henry Gauvain: Surgical Tuberculosis.
FRIDAY.—2.15 P.M., Dr. A. A. Davis: Gynæcological Pathology.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics or operations, obstetric and gynæcological clinics or operations, refresher course for general practitioners.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, May 4th, to SUNDAY, May 10th.—ST. JOHN'S HOSPITAL, Lisle-street, W.C. Afternoon course in dermatology.—BROMPTON HOSPITAL, S.W.3. Sat. and Sun., course in chest diseases.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. All-day course in medicine, surgery, and gynæcology.—MAUDSLEY HOSPITAL, Denmark Hill, S.E. Afternoon course in psychological medicine.—Courses open only to members of the Fellowship.

INSTITUTE OF MEDICAL PSYCHOLOGY, Malet-place, W.C.
SATURDAY, May 9th.—11.30 A.M., Dr. Laura Hutton: Common Disorders in School Life. 2 P.M., Dr. J. A. Hadfield: Origin of Psychopathological Conditions in Early Childhood. 3.15 P.M., Dr. Grace Calver: Diagnostic and Therapeutic Methods. 5 P.M., Dr. Emanuel Miller: Common Behaviour Disorders of Early Childhood and their Treatment.
SUNDAY.—11 A.M., Dr. E. A. Hamilton-Pearson: Physiological and Temperamental Factors in the Ætiology of Childhood Disorders. Noon.–1 P.M., General Discussion on Course.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
MONDAY, May 4th.—5 P.M., Dr. S. E. Dore: Epidiascope Demonstration of Skin Diseases.
TUESDAY.—5 P.M., Dr. H. Thompson Barron: Common Skin Diseases in Childhood.
THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Infections of the Skin with Yeast-like Organisms.
FRIDAY.—5 P.M., Dr. W. K. Sibley: Alopecia.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.
WEDNESDAY, May 6th.—2 P.M., Dr. R. T. Brain: Endogenous Factors in Eczema. 3 P.M., Dr. A. Signy: Intestinal Parasites.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
TUESDAY, May 5th.—5.30 P.M., Dr. D. Evan Bedford: The Thyrotoxic Heart and its Treatment.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, May 5th.—3.30 P.M. (Children's Hospital), Prof. Leonard Parsons: Demonstration of Cases of Diseases of Children.
THURSDAY.—4 P.M. (Medical Faculty Buildings), Mr. Percival Hartley, D.Sc.: The Chemistry of Antigens and Antibodies. (Second William Withering lecture.)
FRIDAY.—3.30 P.M. (Queen's Hospital), Mr. Harold Round: Teeth from the Points of View of the General Medical and Dental Practitioner.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, May 5th.—4.15 P.M., Dr. W. Fletcher Shaw: The Use of Radium in Gynæcology.
FRIDAY.—4.15 P.M., Dr. P. B. Mumford: Demonstration of Common Dermatological Conditions.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION
WEDNESDAY, May 6th.—4.15 P.M. (Royal Hospital for Sick Children), Dr. Stanley Graham: Gastro-enteritis in Childhood.

Births, Marriages, and Deaths

BIRTHS

ALLEN.—On April 22nd, at Fulwood, Shotley Bridge, the wife of Dr. R. Barclay Allen, of a daughter.
FOTHERGILL.—On April 18th, at Ambleside, Westmorland, the wife of Dr. E. L. Fothergill, of a daughter.
HILLMAN.—On April 23rd, at Newlands, Liss, the wife of O. Stanley Hillman, M.S., F.R.C.S., of Southsea, of a daughter.
HOUSE.—On April 19th, the wife of Arthur House, M.R.C.S. Eng., of Bicester, Oxon., of a daughter.
HUMPHRIS.—On April 25th, at King's Lynn, the wife of Dr. J. Howard Humphris, of a daughter.
LAWRENCE.—On April 21st, at Albert Bridge-road, London, the wife of Dr. R. D. Lawrence, of a son.
MACIVER.—On April 21st, at Edinburgh, the wife of D. P. MacIver, M.C., M.D. Edin., of a son.
REES.—On April 24th, at Cardiff, the wife of Dr. Edward J. Rees, Pontypridd, of a son.
RUTHERFORD.—On April 20th, at Longtown, Cumberland, the wife of Robert Rutherford, F.R.C.S. Eng., of a daughter.
SPENCER.—On April 20th, at Chorley, Lancs, the wife of Dr. John Spencer, of a daughter.
STEELE-PERKINS.—On April 23rd, at Rosemont, Exeter, the wife of Dr. Guy Steele-Perkins, of a son.

MARRIAGES

FLAVEL—LITTLEJOHN.—On April 18th, at St. John's Church, Alton, Staffordshire, Sidney William Basil Flavel to Mary Victoria Littlejohn, M.B. Aberd., D.P.H.
MIN SEIN—YIN MAY.—On March 15th, at Rangoon, Burma, Captain Min Sein, M.B. Cal., M.R.C.P. Lond., I.M.S., to Ma Yin May, M.B. Cal., M.R.C.P., and F.R.C.S. Edin.
SHEARER—DANN.—On April 24th, in London, Gavin Shearer, M.B. Glasg., Colonial Medical Service, Nigeria, to Rita Mary, eldest daughter of Major E. W. Dann, Reading.
SNELL—SUTHERLAND-HARRIS.—On April 25th, at Burwash Parish Church, Vincent Clark Snell, F.R.C.S. Eng., to Joan Sutherland-Harris, of Heathfield, Sussex.
TAIT—POPE.—On April 22nd, at Holy Trinity Church, Exmouth, Charles Brooke Vaughan Tait, M.B. Lond., D.O.M.S., to Roselle Mary Gladstone Pope, only daughter of the late P. G. Pope and Mrs. Pope, of Exeter.

DEATHS

ARMSTRONG.—On April 14th, at Singida, East Africa, James Septimus Armstrong, M.B. Dub.
CARDALE.—On April 22nd, at Glengall-road, Isle of Dogs, Henry Jasper Cardale, M.B. Edin., in his 66th year.
CARLESS.—On Monday, April 27th, at Worthing, Albert Carless, C.B.E., M.S. Lond., F.R.C.S. Eng., of Overdale, Crieff, Perthshire, in his 74th year.
HERRINGHAM.—On April 23rd, at his sister's home, Lymington, Hants, Major-General Sir Wilmot Parker Herringham, K.C.M.G., C.B., D.M. Oxon., F.R.C.P. Lond., in his 81st year.
JACKSON.—On April 26th, suddenly, at Esher, John William Jackson, M.B. Glasg., late of Shanghai.
LOCK.—On April 21st, in Chelmsford Hospital, the Rev. Lyonel John Lock, M.A. Camb., M.R.C.S. Eng., Rector of Walsoken Norfolk.
MASON.—On April 23rd, at Northallerton, Harry Mason, M.B. Edin., D.P.H., County Medical Officer of Health, North Riding, Yorkshire, aged 59.
RUTHERFORD.—On April 22nd, at Overstrand, Norfolk, Allan Freer Rutherford, M.B. Edin.
SEYMOUR.—On April 15th, at Redhill, Lionel William Seymour, M.R.C.S. Eng., late of Oxford and of Sind Survey, son of Capt. L. W. Seymour, Bombay Light Cavalry, E.I.C., aged 81.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.